

THE IRON AGE

THURSDAY, APRIL 16, 1891.

The Ongley Register and Safety Signal System.

The necessity for an efficient system of automatic safety signals for use in factories, warehouses and other places has led to many inventions for the purpose, but they are all, in many important respects, more or less deficient. A system, to be complete, should provide means by which any neglect of the night watchman in the

a watchman on his rounds reaches any particular station; it also prints the number of the station from which the signal is sent. Thus, if the station be No. 26 and the time be 9.50, these figures will appear on the strip. The locality or order of signaling is immaterial.

An important fact is that, if for some very unlikely cause, the clock movement should stop, be damaged or in any way affected, this will not entirely prevent the registration. In such case only the time

would instantly print the number of stations where such tampering occurs. The instrument itself stands on a handsome wooden base 3 feet 6 inches in high, and is inclosed in a glass case with nickel frame 20 x 15 x 8 inches in size.

The Station.

Sometimes, in addition to the rounds required of a watchman at night, there exist places where there is liability to conflagration or danger to employees from machin-

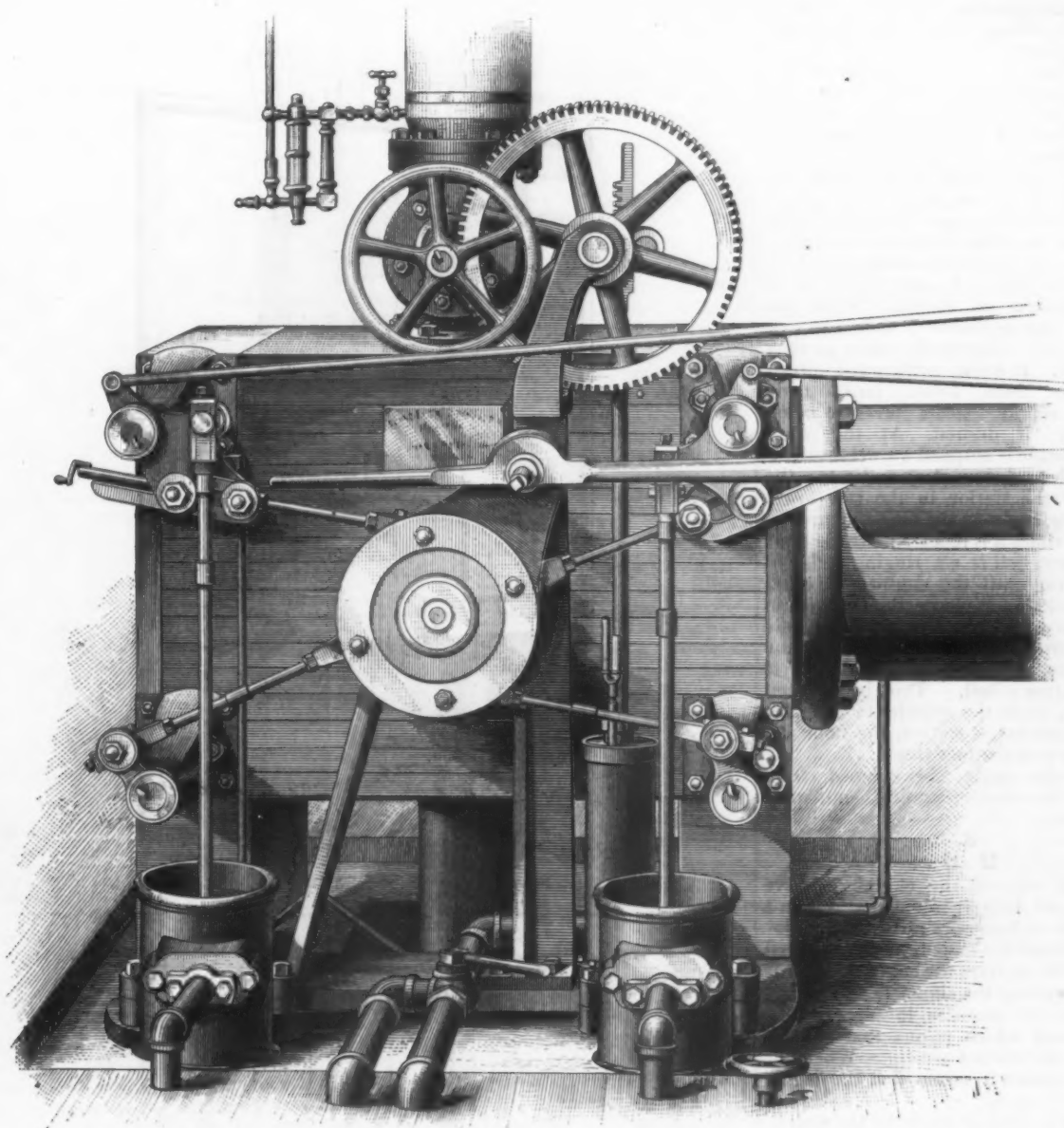


Fig. 1.

THE ONGLEY METHOD OF STOPPING AN ENGINE FROM ANY STATION.

performance of his duties could be recorded in print. It should provide means by which an alarm could be promptly sounded in case of fire, and in establishments where machinery is used to enable the engine to be immediately stopped, in case of an accident, from any distant point, independent of the engineer. These features are embodied in the system we are about to describe.

The Register.

This instrument prints upon a strip of paper, 1 inch wide, the time at which

would be omitted, the numbers of stations visited being printed as usual. From these registrations it could be at once discovered if the watchman had failed in his duty. This quality is said to be possessed by this system alone. The register can be used without special arrangement for from one to 90 stations, and any number of watchmen may record upon the same register without conflicting.

Should the system be meddled with, such fact would be at once detected by the reading on the paper strip, as the register

ery by day. Sometimes machinery in swift motion becomes disarranged, causing serious damage; rapidly revolving wheels may break, bolts may catch, &c. It may be desirable for these reasons to be able to instantly stop the engine from various places in a building. At such localities are placed stations, which are small iron dust-proof boxes, from which project handles. When at rest these handles are at 0, but they may be readily turned to numbers 1, 2, 3 and 4.

Should it be needful at any time to stop

the engine from any of these stations, however distant, it is only necessary to place the handle over the figure 4, and then release it. Before the handle will have returned to its normal position—about ten seconds—the engine with all attached machinery will have quickly and silently stopped, independently of any action on the part of the engineer, and more smoothly than if the engineer were standing with his hand on the throttle at the instant the signal was given.

This part of the system is accomplished by a simple electric hydraulic valve, shown in Fig. 2, placed at any distance desired from the engine, being piped to a cylinder connected with the throttle valve, and which does not interfere with the engine's usual working, whatever its size or style.

The accompanying engravings show how this is accomplished. The hydraulic valve is actuated by the electro magnet when the handle of any station in the system is turned to 4. Water is thus admitted to the hydraulic cylinder, which is shown behind the right-hand dash pot in Fig. 1. From the piston of this cylinder extends a rod formed at its upper end with a rack which engages with a pinion on a shaft carrying a gear engaging with a pinion on the stem of the throttle valve. The raising of the piston closes the valve. This electric valve is automatic in its action, requires no resetting when its work is accomplished, and can be instantly and repeatedly used as may be required. It works with water pressure taken from house tank, main or other supply, steam pressure being substituted if desired. At the same time the engine is stopped a special instrument (called a recorder) indicates the number of the station in the two lower squares, Fig 2, also in the upper square the number of times it is repeated. At the same time an alarm bell is set ringing and continues to ring until the engineer or other person in charge replaces the numbers to zero by the use of the handle at the base of the recorder; in this way no mistake can be made, as by the use of the old style of single-stroke bell. This is repeated four times, while the register in the office prints the number of station, the hour and the minute four distinct times.

Should the engine be stopped from station 26 the recorder would then display these figures :

4
2 6

We will suppose the engine to have been stopped because some machine in a distant part of the works had become deranged. After the fault has been repaired it is desirable to start the engine. This is done by sending the signal 1, which then appears on the recorder, in place of the figure 4, and which means that the engine is to be started slowly. When the signal 2 appears it means that the engine is to run full speed.

Figure 1 is used at night by the watchman to register his movements. Figure 3 is to be used either by night or day for fire or burglar alarm, or for one watchman to call a comrade or patrolman to his assistance from a distance.

If by day figure 3 is used for fire alarm, and there be a lack of water pressure in the building, so that a steam pump is required, an extra valve may be arranged so that when the handle is placed at figure 3, and at the same moment a button is pressed in the bottom of the box, the steam pump will start and the gong in the engine room will repeat the number of stations three times, all of which will be, as usual, recorded by the register.

When the handle is placed on figure 3 at night for the above cause, a continuous automatic signal begins which cannot be stopped by the person giving it, and which allows him to leave the station for any

purpose while continuing to sound the alarm. The station from which this is given is, as usual, noted on the register, thus saving time in determining where the watchman can be found.

In order to insure the perfect working of all the stations apparatus, &c., and to be able to test it daily, the building is wired in such a manner that the wires begin in the engine room and from thence run to all the various stations without loops or branches from the main line, returning again to the engine room, at which point there is a station from which the engineer may, twice a day or oftener if he chooses, stop his engine by using the system. By so doing he completely tests every circuit, and should any of the wires, batteries or appliances fail to be in perfect

system is controlled by the Ongley Electric Company of 1 Broadway, New York.

The American brain is fertile in patentable devices. Up to March 31, 1891, and since 1837, 444,652 patents had been issued from the Patent Office; and prior to that time about 10,000 had been issued without being numbered as by the present method. It is difficult to comprehend in spite of the figures that it is possible for 4815 patentable combinations to exist in devices for coupling railway cars, or that there can be 378 kinds of padlocks. In grain binders there has been such great activity that there are 1160 patents on them, while another aid to the farmer, the harrow, has 1300 patents to show in how

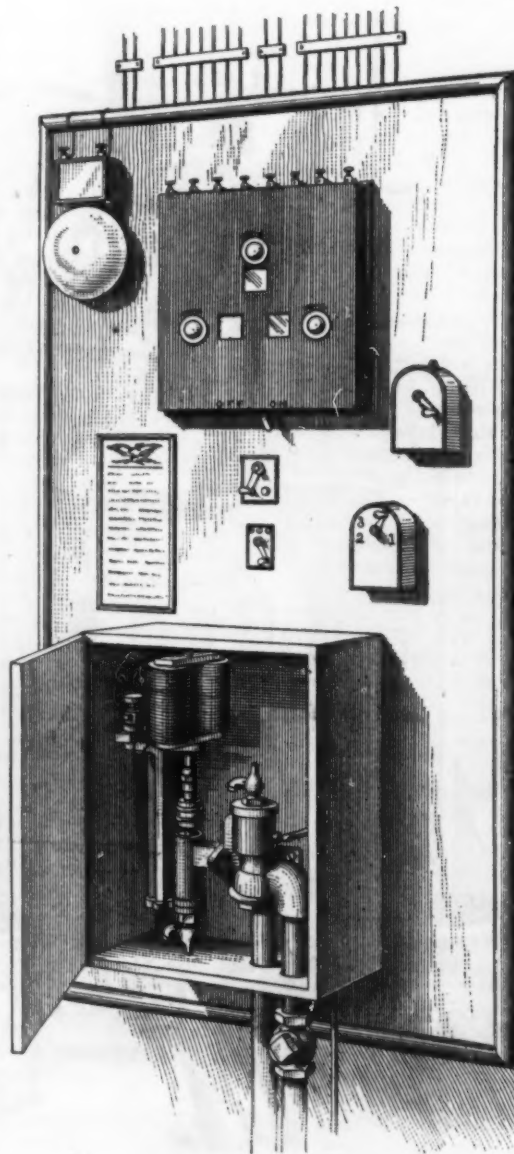


Fig. 2.—Electrically Actuated Hydraulic Valve.

working order he will be at once cognizant of the fact. It will readily be seen that this constant use is a perfect check on the accuracy of this system. The power with which all this is accomplished is but 12 cells of open-circuit battery.

It is evident that the several parts of the system can be installed independently. For example, if there is no machinery to be controlled, as in the case of hotels, warehouses, stores, &c., and only a watchman is employed, then the register and fire alarm can be used separately. Again, if only the engine-stopping device is desired, it can be furnished without the other portions. In short, divisions of or additions to the apparatus can be made to suit the requirements of the case. This

many ways clods can be crushed. The work of digging potatoes is made easy by 651 different devices to do it mechanically, and there are 241 devices to chop up corn-stalks and fodder. Then there are 307 different sorts of hoes.

Reports come from China that the Chinese Government has recognized great possibilities for its country in the manufacture of steel, and that the Government is about to go in for steel making on a pretty extensive scale. Already, it is stated, blast furnaces of 100 tons capacity are being erected in the vicinity of Hankow, while Bessemer and Siemens-Martin steel plants are also to be put up at the same place.

The Calculation of Blast-Furnace Slags.—II.

BY A. J. ROSSI, NEW YORK.

We can admit, then, that we dispose of a certain mixture of ores, corresponding to a certain average analysis—for instance, such ore as given in A. The same remarks apply to limestone and fuels used. The latter may be all coke or all anthracite, or a mixture of the two. We know in all cases the average analysis of the stone to be such as B and that of the ashes of the coal (expressed as per cent. of coal) to be such as C.

With these data it is required to calculate a charge—that is, the relative proportions of ore, stone and fuel which must be charged into the furnace—so that the slag resulting from the slag-making materials will be of such a character as to have a fusibility corresponding to a dark grade of iron, such a slag, for instance, as type No. 5, a slag of the hypothetical composition, reduced in lime and silica, as follows: Silica 34.88, lime 65.12. Any composition of slag, expressed in lime and silica, falling between the types tabulated (Table I) may be adopted and be obtained by proper charges. The hypothetical types figuring in this table represent simply certain standard compositions very frequently met with in blast-furnace practice, of which the fusibility is pretty well known or has been ascertained by direct experiments. But should any such composition falling between any two of these typical slags be thus adopted as the basis of calculation, for instance, a composition of silica 30, lime 70, falling between types No. 2 and No. 6, the calculations would be carried on in identically the same manner as explained further, only the saturation that such composition represents would have to be calculated, as it does not figure in the table. But if it is intended that 70 pounds of lime will saturate 30 pounds of silica, it is easy to find that 1 pound

of lime will saturate $\frac{30}{70} = 0.2428$ pound of silica, and that 1 pound of silica will take up $\frac{70}{30} = 2.33$ pounds of lime, and these figures should be used in the following operations. As far as fusibility and accompanying grade of iron are concerned, we would have every reason to expect that they would fall between those corresponding to the types 5 and 6, closer to one or to the other, as the composition of this sub-type adopted would approximate closer to No. 5 or to No. 6. We may remark here incidentally that the type No. 5, which represents a slag actually run in an English furnace, is not likely to be met often in ordinary practice. As regards type No. 6 it corresponds to a very basic slag made in a Scotch furnace running on Scotch pig No. 1x, kish cinder. It is not an economical slag on account of its decreased fusibility, due to the increase of its basicity.

The coal or fuel is an element in the calculation of the slag which is, within certain limits, independent of the ores and stone used. Its amount can never be less per ton of pig iron made, even if the latter is considered (as we will do it) as containing 100 per cent. of iron, than that necessary to furnish by its combustion the number of thermal units capable of melting one ton of pig iron and whatever slag there may be, and furnishing the heat for the decompositions and combinations which take place. A proper allowance must be made for the ashes it may contain. Practice and proper calculations have shown that with most ores an allowance of $\frac{1}{4}$ ton of coal per ton of ore smelted,

containing about 10 per cent. of ash, is ample for 45 to 50 per cent. ores, corresponding then to about $1\frac{1}{4}$ tons of coal per ton of pig metal. With good coke and anthracite yielding less than 10 per cent. of ash, the slag making materials furnished by the fuel to the slag do not enter but for a comparatively small percentage in its composition, particularly when ores are below 50 per cent. in iron. This percentage is almost small enough in many cases to be neglected, and the coal ignored entirely in the calculation of the slag, whenever a close approximation is not deemed necessary.

It would be easy to show, by proper figures, that having assumed in the calculation of a slag, for instance, the preceding proportion of $\frac{1}{4}$ ton of good fuel per ton of ore smelted, any variation either way within even 25 to 30 per cent. of this quantity, $\frac{1}{4}$ ton, would hardly affect the composition of the slag within 3 to 4 per cent. at the most, so that keeping the charges of ore and stone the same in a furnace, the quantity of coal could be varied according to circumstances without the necessity of beginning anew the calculations to ascertain the composition or, at least, the type of the slag. Still, it can be done in all cases were a greater accuracy deemed of any importance. In calculating slag it is generally admitted that half the manganese present in the ores, stones and fuel goes into the slag as oxide of manganese, and the other half goes to the pig iron. Whenever the quantity of manganese oxide is small, below 0.50 per cent. or even 1 per cent. as it is most generally in magnetites, it may be either entirely ignored or taken as passing as a whole in the slag as desired, or assumed that half goes to make the slag, as already said.

Manganese is met in the ores in different states, either as Mn_2O_3 , as it is generally admitted it exists in magnetites, or as Mn_2O_4 , sesquioxide, as in limonites and hematites, or as MnO , protoxide, as in spathic carbonates, or even as MnO_2 in special ores (pyrolusite), but which are not used in blast furnaces. It occurs in the slag as MnO , manganese protoxide. Whenever the ores contain important quantities of manganese, besides figuring as oxide of manganese of a certain oxidation, the metallic manganese is always given, and Table II will give at once how much 1 pound of metal will give of oxide in the state of oxidation in which the metal enters the slag. Below 3 or even 4 per cent. of manganese, is a very large amount for ores and enough to have them called manganeseiferous, in whatever state of oxidation the manganese may be present in the ores, it can be assumed without practical error in calculating a slag that it exists as protoxide of manganese, if the metallic manganese is not given; 1 pound of manganese gives 1.38 pounds of Mn_2O_3 ; 1.40 pounds Mn_2O_4 1.29 MnO , and we see that the differences are small enough to be neglected.

Very frequently alkalies are present in iron ores. We have had ores in our practice containing regularly 5 to 50 per cent. alkalies, enough to supply in the slag from 1.71 to 3.80 per cent. of alkalies, according to the proportion of these ores used in the charges. Alkalies are generally tabulated as "alkalies" without any special mention as to their being potash or soda or both. In such cases their percentage is small enough, 1 or 2 per cent. or more, to admit, as perfectly sufficient in calculating a slag, an average equivalence in lime for alkalies, between 0.594 pounds for potash and 0.903 pounds for soda (Table II), or about 0.75 of lime per pound of alkalies not specified. Of course, if each one of the alkalies has been determined, the proper equivalence is applied to each.

Sulphur, silicon in the pig and losses of

iron by volatilization or otherwise, as well as by iron entering the slag, are not taken into consideration. In calculating the pig obtained it is reckoned as containing 100 per cent. of iron. It would be perfectly possible to take all these different factors into consideration, but there is a certain margin in the fusibility of the slag; it is not such an absolute mathematical function of its composition that a difference of 1 to 2 per cent., and even a little more either way, between the constituents of a typical slag and those of any slag calculated or assumed, transformed into lime and silica, could be considered as implying a practical difference in the fusibility of the two compounds or their other characters, or involving a difference of cost or grade in the pig iron obtained.

Let us assume, then, that we have at our disposal ores, stones and fuel of which the average analyses A, B, C are given as follows:

Average ore mixture.	Average limestone used.	Ash of fuel burnt: Anthracite coal, Lehigh, with 6.28 per cent. ash.
A.	B.	C.
Silica....20.00	Silica.... 6.00	Silica.... 3.35 %
Alumina 3.20	Alumina 1.15	Alumina 2.73 %
Lime.... 3.10	Lime.... 30.00	Lime.... 0.70 %
Magnesia 2.60	Magnesia 19.00	Magnesia 0.10 %
Ox. manganese. 0.20	Carbonic acid. ..44.20	6.28 %
Phosphoric acid 1.05	100.35	
Sulphur. 0.09		
Oxide of iron...70.00		
100.25		
Metallic iron 50 per cent.		

We have decided to obtain a slag, as stated previously, of such a character that its fusibility will be about that of the type No. 5, a slag which generally accompanies the darkest grades of gray from No. 2xx to No. 1 foundry. An allowance of $\frac{1}{4}$ ton of fuel per ton of ore smelted is ample; with ores at 50 per cent. of iron it would correspond to 1.50 tons of coal per ton of pig, and for any other percentage of iron in ores, say 60 per cent., it could be readily found that it corresponds to $1.50 \times \frac{50}{60} = 1.25$ tons of coal

per ton of pig, counting the pig iron as 100 per cent. of iron. If it were desired to be more accurate, the quantity of iron, 94 to 98 per cent., contained in a ton of pig would have to be assumed. At any rate this has nothing to do with what we will take as a basis of our calculations, 0.75 ton of fuel per ton of ore smelted.

Transforming all the analyses A, B, C into lime, using Table II, we have:

A. Ore 1 ton.	20.00
Silica	20.00
Alumina = $3.20 \times 1.631 = 5.22$	
Lime =	3.10
Magnesia = $2.60 \times 1.40 = 3.64$	
Ox. manganese = $0.20 \times 0.78 = 0.15$	
	12.11 lime.

and the ore is equivalent in 1 ton to:

Silica.....	20.00 per cent.
Lime.....	12.11 per cent.

C. Stone 1 ton.

Silica.....	6.00
Alumina = $1.15 \times 1.631 = 1.87$	
Lime.....	30.00
Magnesia = $19 \times 1.40 = 26.60$	
	58.47 lime.

and the stone is equivalent in 1 ton to:

Silica.....	6.00 per cent.
Lime.....	58.47 per cent.

B. Fuel ash, 1 ton of coal.

Silica	3.35
Alumina = $2.73 \times 1.631 = 4.45$	
Lime = $0.70 \times 2.33 = 1.63$	
Magnesia = $0.10 \times 1.40 = 0.14$	
	4.69 lime.

and the fuel is equivalent in 1 ton to:

Silica.....	3.35 per cent
Lime.....	4.69 per cent

As we use only $\frac{1}{4}$ ton of coal per ton of ore, the slag making materials derived from the coal used per ton of ore amount only to three-quarters of the above analysis B, reduced to lime, or

Silica..... 2.52
Lime..... 3.52

and we have thus, in 1 ton of ore and $\frac{1}{4}$ ton of fuel required to smelt it:

Silica = $20 + 2.52 = 22.52$ per cent. of a ton.
Lime = $12.11 + 3.52 = 15.63$ per cent. of a ton.

In order to make the proper silicate of type No. 5, one pound of lime takes up 0.536 pound silica. Therefore, the 15.63 of lime in coal and ore will take up $15.63 \times 0.536 = 8.377$ of silica, leaving, as unsaturated silica in the ore and coal, $22.52 - 8.377 = 14.143$ per cent. free silica to saturate with lime from the limestone.

The 6 per cent. of silica in the limestone will require, at the rate of saturation of type No. 5—that is, 1.866 pound of lime for every pound of silica— $1.866 \times 6 = 11.196$ of lime, leaving of free lime, or the equivalent in the limestone, $58.47 - 11.196 = 47.274$ per cent. free lime in one ton of stone. We have to saturate in coal and ores 14.143 free silica; at the rate of saturation adopted it will take only $14.143 \times 1.866 = 26.390$ free lime. We have 47.274 of free lime at our disposal in 1 ton of limestone, and we have to supply only 26.390 free lime to saturate free silica in ores and coal, hence we need, 25.39 per ton of ore and $\frac{1}{4}$ ton of fuel, 47.274 ton = 0.5582 ton of stone. The charges are then per ton of ore:

1 ton of ore
 $\frac{1}{4}$ ton of fuel
0.5582 ton of stone.
and if we reckon on 2 tons of ore per ton of pig, estimating pig at 100 per cent. of iron we find per ton of pig yielded: 2 ore * 1.50 coal 1.12 stone

Taking the charges per ton of ore and referring to analyses A, B, C, we find that the slag will contain then:

Silica: From 1 ton of ore and $\frac{1}{4}$ ton of coal, as found before..... 22.52
From 0.5582 ton of stone calculated to be necessary 6 per cent. $\times 0.5582$ ton... 3.35
— 25.87

Lime: From 1 ton of ore and $\frac{1}{4}$ ton coal..... 15.63
From 0.5582 ton of stone calculated to be necessary per ton of ore 58.47 per cent. $\times 0.5582 =$ 32.74
— 48.37

and the composition of the slag is:

Silica..... 25.87
Lime..... 48.37

Total..... 74.24

Reducing to a percentage we find, as the composition of the slag:

Silica..... 34.85
Lime..... 65.15

Total..... 100.00

exactly a type No. 5 (bibasic slag), of which the composition:

Silica..... 34.88
Lime..... 65.12

Total..... 100.00

Using the preceding charges and relative proportions of ores, stone and coal, we would have every reason to expect a slag of the above composition or of one very close to it, in ordinary and regular circumstances of running and of ores, unless foreign elements in the ores (such as

chromium, for instance), intervene as a factor to change the grade of an iron to be expected from such a slag. We could quote a number of examples in which a slag calculated in this manner, *a priori*, has given at the analysis of the same slag, actually run from charges thus calculated, a composition near enough to be taken as a good duplicate of the former. The composition given above is that of the type of the slag reduced to lime and silica, not that of the slag itself. If we want to find the complete composition of the slag, we have only, using the relative proportions of the different materials entering the furnace, calculated as explained, to apply to each one of the constituents of these materials the percentage in which they are present, as furnished by the analyses A, B, C, and we will find, making the calculation per ton of pig, for instance, the following composition. We could make the calculations per ton of ore smelted, and we would obtain exactly the same figures for the ultimate analysis, all the quantities used in the operations being proportional:

Materials Entering in the Slag Per Ton of Pig.

	From 2 tons of ore. Tons.	From 1.50 tons coal. Tons.	From 1.116 tons stone. Tons.	Totals. Tons.
Silica.....	0.4000	0.0503	0.0170	0.5173
Alumina.....	0.0640	0.0400	0.0128	0.1177
Lime.....	0.0620	0.0015	0.3348	0.3983
Magnesia.....	0.0530	0.0015	0.2120	0.2655
Ox. manganese.....	0.0040	.....	.....	0.0040
Totals.....	0.5820	0.0942	0.6266	1.3028

The calculations explain themselves. There being, from analysis A, 20 per cent. silica in 1 ton of ore, this corresponds in 1 ton to 0.2 ton of silica, and in 2 tons of ores, relative proportions of ores in the charge per ton of pig, 0.2 ton $\times 2 = 0.4$ ton, and so on.

	Slag-making materials. Tons.
The ores furnish to the slag.....	0.5820
The stone furnishes to the slag.....	0.6266
The fuel furnishes to the slag.....	0.0942
Total slag-making materials.....	1.3028

And we may remark here incidentally that in this amount, 1.3028 tons of slag, the total coal ash enters only for 0.0942 ton, that is for about 7 per cent. only of the slag. In this 1.3028 tons of slag we find:

Silica..... 0.5173
Alumina..... 0.1177
Lime..... 0.3983
Magnesia..... 0.2655
Oxide manganese..... 0.0040

Total..... 1.3028

Or reducing to a percentage, the analysis of the slag is:

Silica..... 39.71
Alumina..... 9.03
Lime..... 30.57
Magnesia..... 20.38
Oxide manganese..... 0.31

Total..... 90.99

Of course, if we transform all the bases into lime, we reach the typical slag adopted as the basis of calculation. We will illustrate it by making the calculations in full:

Silica..... 39.71
Alumina = $9.03 \times 1.631 = 14.73$
Lime..... 30.57
Magnesia = $20.38 \times 1.40 = 28.53$
Ox. manganese = $0.31 \times 0.78 = 0.23$
lime..... 74.06

Or,

Silica..... 39.71
Lime..... 74.06

Total..... 113.77

Or, reducing to a percentage, we have, using only two places of decimals:

Silica..... 34.90
Lime..... 65.10

Total..... 100.00

Exactly the type expected:

Silica..... 34.88
Lime..... 65.12

Total..... 100.00

A slag of a certain type corresponds most generally to a certain grade of iron looked for, and blast-furnace practice corroborates this statement. The examination of 70 slags run in blast furnaces, and for which the accompanying iron was known, beyond doubt, affords a very good corroboration of this assertion.

The composition of the slag obtained can be expected to be what it was calculated; or, at least, very near it, if the analyses of the ores, stones and fuel represent well the average composition of these materials. Should the iron prove to be rather lighter in grade than expected or wanted, the charges could be calculated, assuming for the slag, as we have explained, an intermediary composition between the type used first as the guide and the following. *Vice versa*, should the iron prove to be rather darker, than actually wanted, and that at the expense of a consumption of fuel not compensated by the advantages desired from the grade of iron obtained, a type rather less basic than the one first decided upon should be taken as basis of a fresh calculation of slags.

Railroad Lake Rates.

The rail and lake rates from Pittsburgh to St. Paul common points will go into effect April 21. The schedule this year is much higher than for last season, on some of the upper classes the advance being as much as 29 cents. The new rates for iron and steel will be, less than carloads, 37 $\frac{1}{2}$ cents; carloads, 28 cents. The rates last year were 27 and 22 $\frac{1}{2}$ cents.

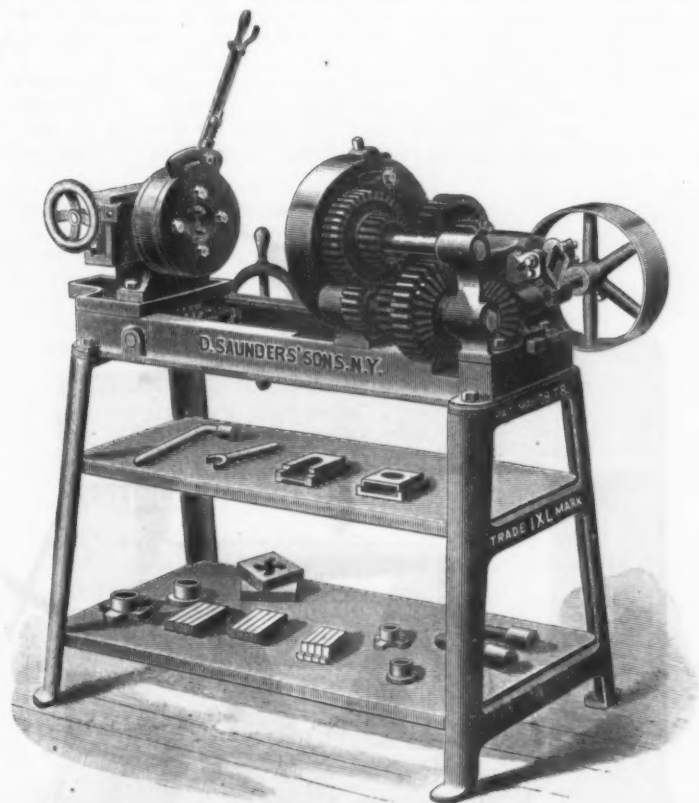
For the six classes the rates are 92 $\frac{1}{2}$, 97 $\frac{1}{2}$, 57 $\frac{1}{2}$, 40, 32 $\frac{1}{2}$ and 28 cents. The all-rail rate is 10 cents higher on the first three classes and 5 cents on the last three. There is some consolation in the expectation of freight agents that these rates may be slightly reduced later in the summer.

A Sheffield paper takes a gloomy view of the prospects of ironmasters in England, discoursing as follows: "The signs of the times are all against them. Everybody seems to be playing a waiting game. A spurt in the shipbuilding trade would be a great boon, but there is no likelihood of it as yet. The important carrying industry is not in a state to encourage additions to the merchant fleet. There is uncertainty, too, in regard to the coal field. The miners, it is feared, may cause trouble. Without confidence as to the future, business men hesitate to take in hand new work. As a leading authority was heard to put it this week, 'Trade is being frightened.' Pig iron can now be bought at 58s. 6d. per ton, delivered in Sheffield. Such a low price has not been reached since April of 1889. At such a figure iron cannot be made with profit. Thus the hopeful aspect of last year is being gradually clouded over, and the outlook gets gloomier every day. Nor is it only in the iron industry that languor prevails. The collapse in the Argentine Republic has been so disastrous that the railway material trade, for which that country was the chief customer, has been partially paralyzed. There is, happily, a fair business in railway material with other markets. Although the exceptional call for war material, chiefly in armor plates, has now ceased, there remains work in hand adequate to keep the mills going for this year at least."

* Had the ores been 60 per cent. rich instead of 50 per cent., instead of 2 tons of ore per ton of pig there would have been required only $2 \times \frac{50}{60} = 1.666$ tons of ore per ton of pig, and the charges, obtained per ton of ore, as before, would have had to be multiplied by 1.666 instead of 2, as was the case with the preceding ores, to obtain the charges per ton of pig reckoned at 100 per cent. iron.

Threading or Cutting Pipe Machine.

The engraving on this page represents the I X L special machine for threading or cutting pipe by power or hand which has just been placed on the market by D. Saunders' Sons of Yonkers, N. Y. It is arranged with the adjustable expanding die with interchangeable chasers, threading $\frac{1}{4}$ to 2 inches. The cutting head is so constructed that either the expanding die or solid dies can be used.



POWER OR HAND THREADING OR CUTTING PIPE MACHINE.

The die is placed on front of the cutting head next to the gripping chuck, which permits of short pieces of pipe being threaded without the use of nipple sockets. The chasers in the die have throw enough to expand them to give ample clearance for the pipe to pass through into the guide in the cutting head without injury to the chasers. The chasers are readily adjusted from one size to another to the standard gauges provided with each machine.

The gripping chuck is of substantial construction; the chuck on the back end of the spindle for centering the pipe is self-centering. The cutting head is arranged with a slide and cutting-off tool and self-centering jaws to steady the pipe while being cut off. The carriage is moved by rack and pinion worked by hand wheel on the side of the machine. When arranged for power the pulley, 12 inches in diameter by $3\frac{1}{4}$ inches face, is placed on the cross shaft, as shown. The machine is well adapted for jobbing machine shops, for cutting off round iron and steel, and with the bolt-threading and nut-tapping attachment makes an excellent bolt threader and nut taper.

Adjustable Expanding Die.

This die is also made by D. Saunders' Sons. It belongs to that class of dies for screw cutting designed so they can be attached to any ordinary pipe-threading machines in use for threading steam and gas pipe.

The distinguishing features of these are the arranging of the die block or head with a number of sets of chasers all fitting into the same, to thread the different sizes of pipe. The head is adjustable and expanding, the thread being cut in once

passing over. When the thread has been cut to the desired length the cutters or chasers are opened by a movement of the lever, and the pipe released without stopping or reversing the motion of the machine. One set of chasers can be withdrawn and another set inserted in a few minutes, and adjustment to size is readily effected.

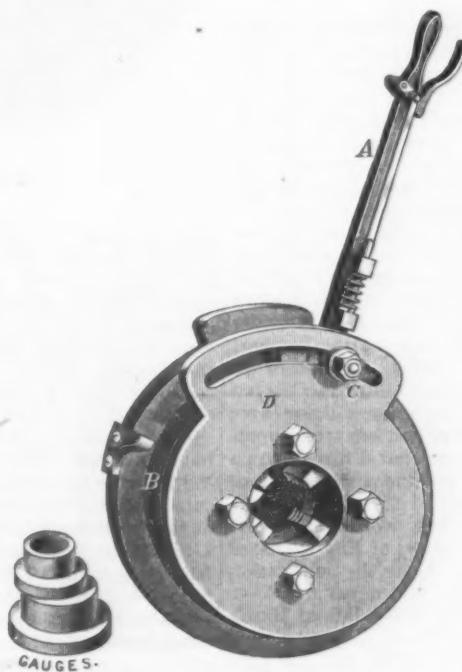
These dies do not require to be moved from their place while cutting off the pipe, as they expand to allow the pipe to pass through into the guide in the cutting off

the chasers or any other part; also to recut old chasers without the die block they fit into.

The following directions for using, setting and changing the chasers clearly explain the construction of the die:

When the cam ring B is turned until the lever and latch A lock in the stop C, the chasers, if properly adjusted, are closed and ready for threading the pipe. When the thread is cut to the required length, reverse the cam ring by the lever A, and at the same time remove the latch, that will withdraw the chaser from the pipe; then run back the carriage. Now close the chaser by bringing the lever and latch A to lock in the stop C again, then it will be ready for the next cut. To change the diameter to fit irregular size fittings, slide stop C backward or forward to enlarge or diminish the opening of the chasers. This can be readily done by loosening the nut that holds stop C. To change the chasers, remove the front plate D to allow the chasers to be taken out, then insert another set of chasers for the size you wish to thread, in the order in which they are marked. Care should be observed in placing the chasers according to their respective numbers, otherwise no thread will be cut. Then replace front plate D to keep chasers in position. Now lock the lever and latch A together by lock in stop C, loosen the nut of stop C, turn the cam ring B by lever A, and close the chasers on the gauge, placed inside of the chasers for the size to be threaded, keeping the flange on gauge up to ends of chasers. When adjusted tighten the nut to secure sliding stop C in place, remove the gauge and then bring lever and latch A to lock in stop C. It is now ready to thread pipe to that gauge.

Although no official report of the trial trip of the gunboat Bennington last week has been received at the Navy Department, private advices are to the effect that the estimated horse-power developed by the main engines was 3350. Allowing 100 horse-power for the auxiliaries, the vessel would have exceeded the requirement of 3400 by about 50 horse-power, and earned a small premium.



ADJUSTABLE EXPANDING DIE.

and used again, which operation can be repeated several times.

The dies are carefully fitted by milling, planing and turning to steel gauges, thereby enabling the makers to duplicate

The constructors, N. F. Palmer & Co., have asked permission from the Navy Department to send the vessel from their slips to the Brooklyn Navy Yard pending her acceptance by the Government.

Progress of Naval Construction.

Secretary Tracy last week delivered an address in Boston, and in the course of his remarks gave an interesting sketch of the work of naval construction coming under his supervision. At the present time the Navy Department is engaged in the construction of 25 vessels, all but five of which were begun during this Administration, although seven others had been practically designed. Two others will shortly be begun. The majority of these vessels are building by contract, but not a frame or a plate is shipped to the builders without an inspection and test at the mills, or is put into the vessel except under the eye of the supervising constructor and engineer. Eleven new vessels have been completed and placed in commission since the beginning of the Administration, and two more are nearly ready.

After an animated controversy in Congress and in the press, Congress declared in favor of first-class battle ships and three were accordingly authorized last summer. These three ships—the *Indiana*, the *Massachusetts* and the *Oregon*—were contracted for in October, and are to be completed within three years. Their construction is such as to make them available for defense at any point along the North American coast, on the Isthmus, or in the West Indies. Their design was a difficult problem, for it consisted in placing the most powerful guns and the heaviest armor on a hull of moderate draft, suitable for the depth of our harbors. The problem, however, was successfully solved, and for pure offensive and defensive power, the battle ships constitute by far the most important additions yet made to the navy. Of powerful commerce destroyers two types were designed, one, the *New York*, an armored cruiser, in which the four elements of speed, coal capacity, armament and protection have been carefully balanced, with a view to securing a ship superior in all respects to the corresponding type abroad. Her speed of 20 knots is sufficient to overtake 95 per cent of all the ships of the world, naval or mercantile. Her radius of action and her armament far exceed those of the ordinary cruiser, and she would not be a safe antagonist for a battle ship of the second class.

The other type, represented by cruiser No. 12, is one that the Department regards with peculiar interest and favor. She is a triple-screw ship of 7400 tons, uniting a sufficient armament with complete protection against light guns, and having a speed of 22 knots, and a coal endurance that enables her to sail around the world, a distance of 25,000 miles, without replenishing her supply. The merits of this type, absolutely novel in its character, have so commended themselves to Congress that a similar vessel was authorized at the recent session. The first is under contract, the second under advertisement.

Should a crisis arrive, I venture to assert that the protection of the United States will depend more upon these three battle ships and three cruisers than upon any other part of our naval force. As a testimony to the opinion entertained of these latest designs of the Department, I will only quote the words of J. H. Biles, one of the foremost of English naval architects. . . . Since the publication of Mr. Biles' remarks, the naval *attaché* at London has written, under date of March 24, "the paper on our new construction is the talk of the service clubs, and has produced a profound impression. It is generally acknowledged that the designs are in advance of their last here."

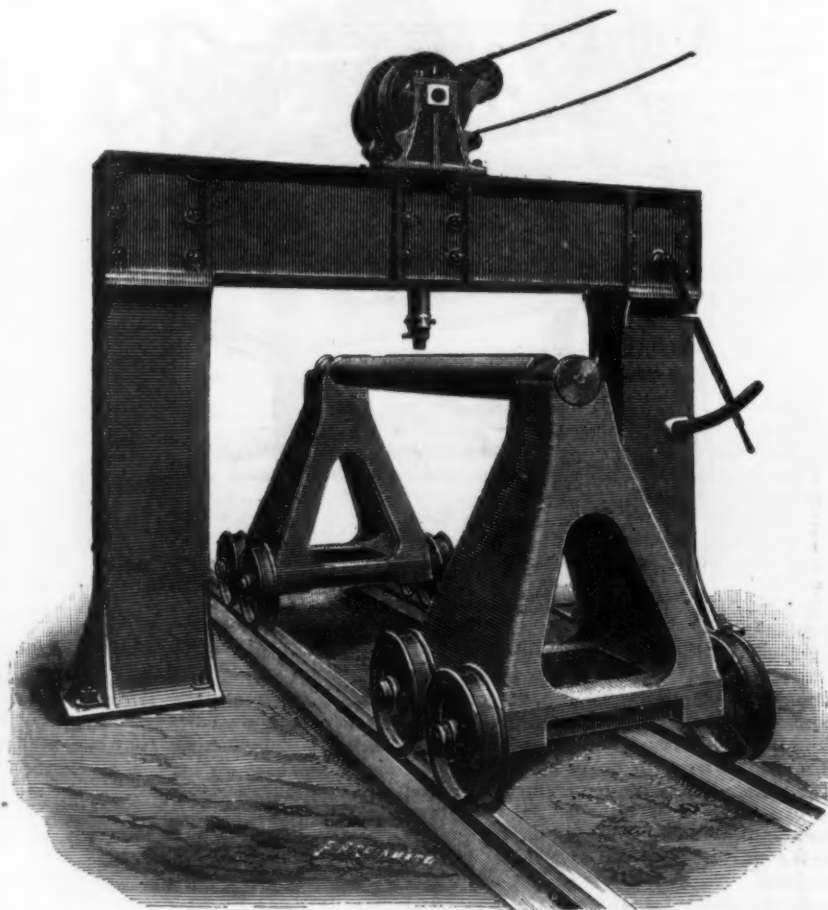
In the subsidiary branches of naval construction we have made substantial progress.

The armor trials held at Annapolis in September last were undertaken with a view

to test the comparative merits of the English system of compound armor, the French system of all-steel armor and a new system which, although it had attracted the attention of the Navy Department, no one had yet adopted, in which a certain percentage of nickel was combined with the steel. No more comprehensive tests of armor plates have ever been held, and in none have the results been more clear and convincing. The complete demolition of the English compound plate was a revelation not only of the power of our guns, but of the weakness of the armor which was hitherto constituted England's main reliance. The all-steel plate, although not entirely shattered, showed a marked inferiority to the nickel. Upon the recommendation of the Department, Congress immediately voted \$1,000,000 for the purchase of nickel, and the armor test produced a sensation abroad

Suspension Pneumatic Power Hammer.

From *Engineering* we take the following description and accompanying engravings of a Thwaites suspension pneumatic power $\frac{1}{4}$ -hundred weight hammer of a new design, for planishing pipes and plates. As indicated in the perspective view, the mechanism is supported at the center of a cross girder resting on two cast-iron square pillars, box section, each bolted down to the foundations by four $\frac{1}{4}$ -inch diameter bolts. The measurements of these columns and girders are given in Figs. 2 and 3, the former an elevation of the hammer, and the latter a plan, partly in section, of the cross girder, while Fig. 4 is a cross section showing the arrangements for operating the hammer. In the center is a cast-iron guide for working the ram, the guide being extended on two sides to receive the



SUSPENSION PNEUMATIC POWER HAMMER.

that has led to a revolution in theory and practice on the other side of the water. In ordnance as well as in armor we have steadily gained ground. The completion and development of the Washington Gun Foundry shows the best results not only in the quality of the work, but in its economy. As a remarkable illustration of this fact, the 8-inch guns, for which the Government formerly paid \$8500 each, have been reduced in cost to \$2270 each. Within the last year we have domesticated in the United States the manufacture of the Whitehead torpedo, the best of its kind in the world, and the most satisfactory description known of armor-piercing projectile. Both of these are indispensable requisites to the efficiency of our naval force.

The East Tennessee, Virginia and Georgia and the Queen and Crescent railway systems have established a joint agency, with headquarters at 193 Clark street, Chicago. Hartwell Osborn is the general agent and W. K. Northam is the contracting freight agent.

disk crank journals, 2 inches in diameter by $3\frac{1}{4}$ inches long. The disk cranks are connected to a hollow steel ram by a connecting rod. The ram is divided inside into two compartments, each having a phosphor-bronze air piston. These are connected together by a steel piston rod, the top air piston forming a connection for the small end of the connecting rod. The outside diameter of the ram is $3\frac{1}{4}$ inches, and the diameter of the air pistons $2\frac{1}{4}$ inches and $2\frac{1}{2}$ inches respectively. Cottered into the bottom of the ram is a steel pallet holder with a dovetail, so that the pallet can be renewed or exchanged for one of another shape when required. Keyed on to the crankshaft is a flanged pulley 10 inches in diameter by $3\frac{1}{4}$ inches between flanges. There is also an overhead countershaft with strap-shifting arrangement. At the side of one of the columns a hand lever and quadrant is provided, as shown in the perspective view and on Fig. 2, for working an arrangement for tightening the belt when the machine is working. To this arrangement is connected a powerful brake which stops the machine in a few revolutions. It will be seen that the brake

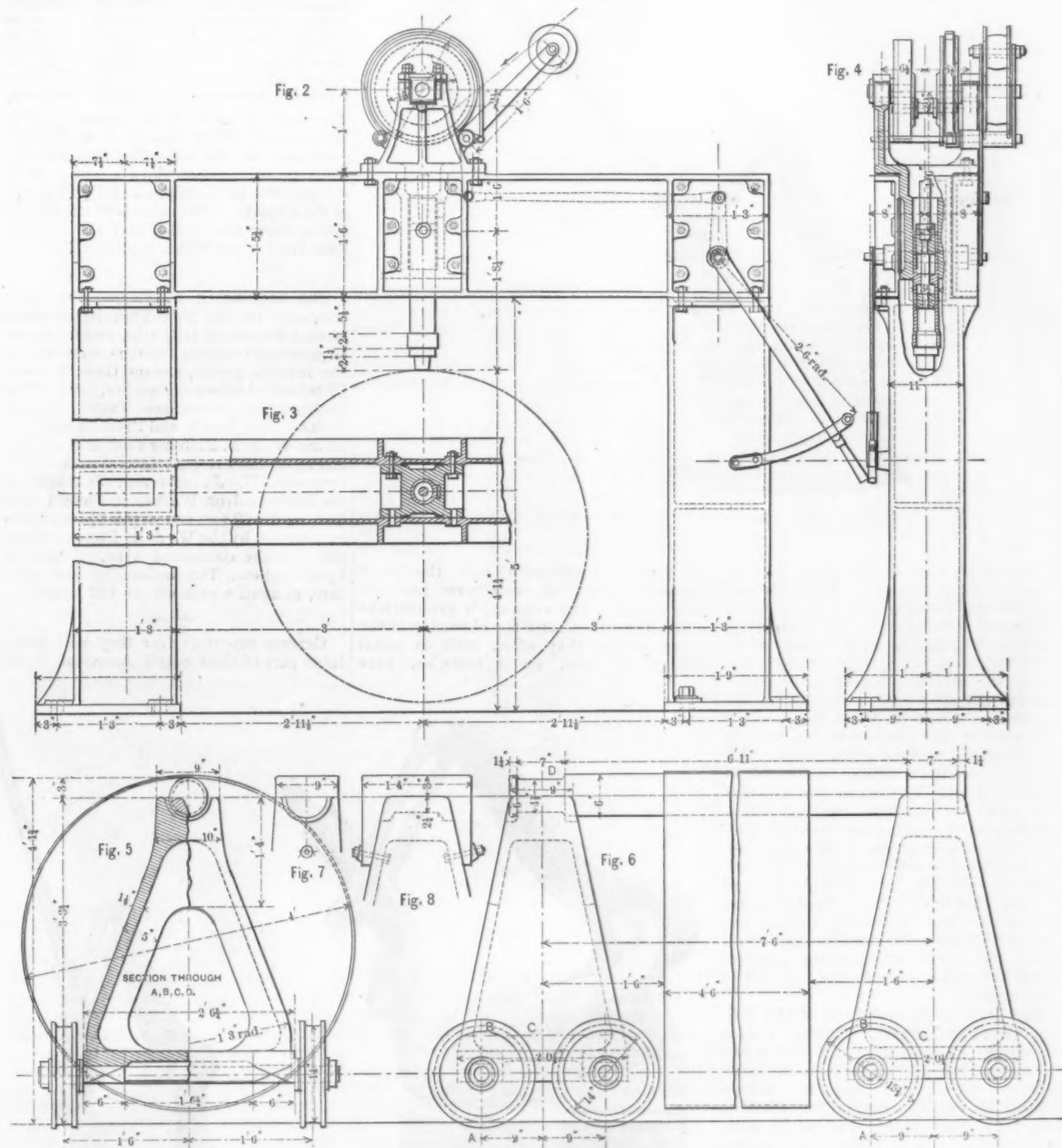
is applied as the belt is slackened for stopping the machine. For planishing pipes or tubes a long wrought-iron mandrel is provided mounted on two cast-iron carriages, each having four flanged wheels for running on rails. The hammer is arranged so that tubes 4 feet in diameter can be worked for planishing plates. A pallet is fastened on the top of one of the mandrel carriages, Figs. 5 to 8 showing the details of the carriages. The general dimensions are: Distance between pillars, 6 feet; height

Forgings for Big Guns.

The War Department has already prepared for issue proposals for materials used for the manufacture of guns, under provisions of the Fortifications act, to take effect with the new fiscal year, viz:

For 25 sets of forgings for steel field guns of 8.2-inch caliber; for 16 sets of forgings for steel field mortars of 3.6-inch caliber, and for 16 steel carriages for the

shelling an enemy behind earthworks or like defenses and out of the direct fire of field guns. Their range is nearly three times as great as the cohorn smooth-bore mortars, the projectile is more than twice as heavy, and great accuracy of fire is obtainable. The weight of the piece is about 525 pounds, so that it can be easily transported in a wagon or moved about by men in the trenches. The armor-piercing projectiles are to be manufactured by a domestic concern, but upon specifications



DETAILS OF SUSPENSION PNEUMATIC POWER HAMMER.

under girder, 5 feet; height from ground to top of mandrel, 4 feet 1 1/2 inches, and length of stroke, 5 inches. This machine is capable of delivering 500 blows per minute. The constructors are Thwaites Brothers, Limited, Bradford, Yorkshire.

Dr. Gatling is said to contemplate improvements in gun making that will shorten the time required for the construction of heavy ordnance about one-half, and a factory will probably be erected in Philadelphia.

same; for steel forgings for 8, 10 and 12 inch rifled coast-defense guns; for 8, 10 and 12 inch armor-piercing projectiles; for excavations and iron work at the new south wing of the Watervliet Gun Factory. For the large coast-defense guns above referred to Congress appropriated \$800,000 for the procurement of the necessary forgings, and the material will be assembled at the Watervliet factory and the finished guns turned out. The 3.6-inch mortars mark a new departure in military field operations. They are intended to replace the small cohorns which are used in trenches for

that will secure the use of some one of the modern European patented processes. For their procurement an appropriation of \$100,000 will be available. The work of construction at Watervliet, for which advertisements have so far been prepared, will, it is estimated, cost about \$75,000.

Italy's exports to the United States last year were valued at \$24,200,000. About one-half of the amount was fruit, and no small portion of it was sold by Italian subjects, from push carts.

Punch, Shear and Bar Cutters.

The accompanying engravings show some new machines designed by the Buffalo Forge Company, Buffalo, N. Y. The first illustration shows a machine which the operator can work either as a punch, shear or bar cutter without a helper. Furthermore, no adjusting is required in changing the work, as the tool can be put

rial are that it is non-corrosive, it requires no paint for protection, and it is not subject to the destructive voltaic action observed in the usual coated sheet metal. The company claim that their metal is in many respects superior to copper, while it is furnished at a price not exceeding that of good quality tin plate. The composition of this metal is stated to be of homo-aluminous properties, as determined upon

&c. The company are also prepared to furnish pure aluminum in ingots, castings, bars, wire, sheets, &c., or aluminum alloys of high grades, such as silver, copper, bronze, brass, nickel and silicon bronze wire.

Argentine Republic Exports.—The following table shows the comparative exports of the principal staples of the Argentine Republic in 1889 and 1890:

	1889.	1890.
Wool, pounds.....	12,000,000	260,000,000
Sheepskins, pounds	80,000,000	59,000,000
Frozen mutton, tons. .	16,500	20,400
Linseed, tons.....	28,300	30,700
Maize, tons.....	450,000	710,000
Wheat, tons.....	24,000	326,000
Tallow, tons.....	18,500	17,460
Cowhides, number.....	3,500,000	4,300,000

The last steamer from Buenos Ayres brought the official returns of the foreign commerce of the Argentine Republic for the year 1890, which show a falling off of \$21,051,604 in the imports and \$8,440,041 in the exports. The exports to the United States were \$6,068,083, and the imports from the United States \$9,307,315.

The tugboat C. E. Evarts, the latest accession to the New York harbor fleet, made a successful trial trip, and a number of prominent engine builders were among the invited guests, among them Andrew Fletcher, Andrew Fletcher, Jr., Wm. Fletcher, Jr., Stevenson Taylor, Samuel Putnam, Ed. Meade and Fred. Cummings, of the W. & A. Fletcher Company; Miller Moore of the Crescent Iron Works, Elizabethport, N. J., and Jas. Johnston of the Paterson Iron Works. Her length is 93 feet, width 20 feet and depth 9½ feet. Her engines are by the W. & A. Fletcher Company, of the compound type, 17 and 34 by 24 inches. The boiler, by the same firm, allowed a pressure of 125 pounds.

German exporters fear they will lose a large part of their South American trade,

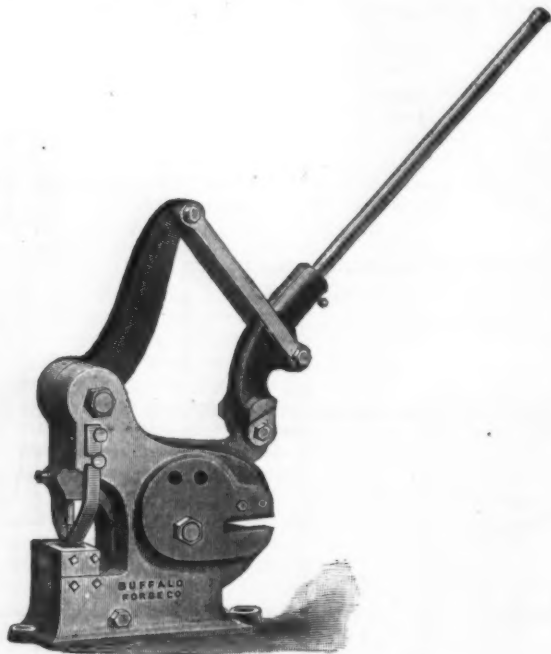


Fig. 1.—Buffalo Punch, Shear and Bar Cutter.

to any of its uses at any time. Special claims are made for power, durability and compactness, and it is said that experience has proved it to be a most satisfactory appliance. The tool is made in four sizes. No. 1 will shear ¼-inch strap iron 1½ inches wide; will punch ¼-inch hole in ½-inch iron and cut off ½ inch. The No. 4, the largest size, will shear ¾-inch strap iron 3 inches wide; will punch ¾-inch hole in ½-inch iron and will cut off 1½ inches. All the parts of the machine are made to standard size, so that when put together they form a well-fitted machine, and, furthermore, the parts are interchangeable. The especial mechanism of this combination machine, as referred to by the manufacturers, consists in a combination of levers so that the cutting is done from the bottom up. This, it is said, enables one man to do more work than two men could with the old-style down-cut machine where the pressure comes down against a dead weight.

Fig. 2 is a general view of the Buffalo Continuous Shear, a special feature of which is a combination of levers which enables one operator to do much heavier work than can be accomplished by the old method of shearing iron. The parts of this machine are made to templates, so that repairs can be furnished which will be accurately fitted. The machines are all made with 3-foot levers and are offered in four sizes, adapted to shear from ¼-inch flat iron to ¾-inch flat iron.

The punch shown in Fig. 3 embodies the same principles of construction as the continuous shear. It is made in four sizes also, and will punch from ¼-inch hole in ½-inch iron to ¾-inch hole in ¾-inch iron.

The Stan-Alumin Metal Company of Canton, Ohio, are manufacturers of a new and patented material for roofing, shingles, eave troughs, conductor pipes, gutters and valleys, which they have named aluminous metal. The special features of this mate-

rial are that it is non-corrosive, it requires no paint for protection, and it is not subject to the destructive voltaic action observed in the usual coated sheet metal. The company claim that their metal is in many respects superior to copper, while it is furnished at a price not exceeding that of good quality tin plate. The composition of this metal is stated to be of homo-aluminous properties, as determined upon

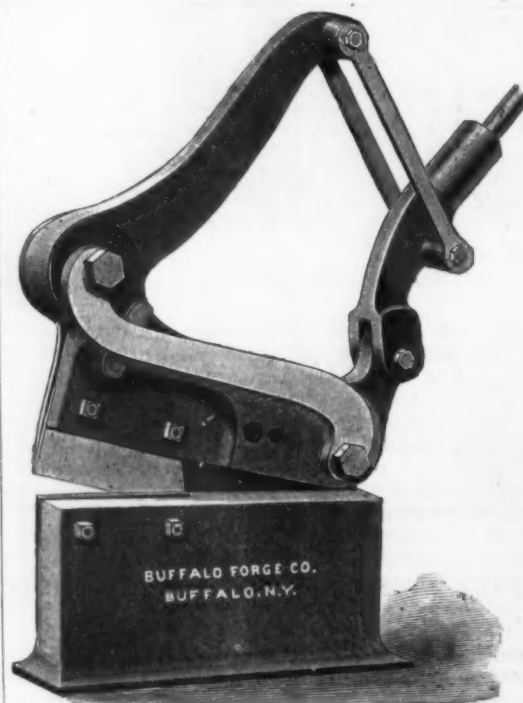


Fig. 2.—Buffalo Continuous Shear.

troughs, corners, gutters, expanding and plain round conductors, tinned adjustable conductor fasteners, tinned corrugated hinged hooks, the Woodruff eave-trough hanger, galvanized conductor strainers, aluminous metal ridging, either plain or ornamental, crestings and finials, crown moldings, cornice, window and door caps,

as a consequence of the United States treaty with Brazil.

The oil tank steamer Maverick, when off the coast of Maine, was in danger of foundering in a heavy gale, but when 300 barrels of oil were pumped overboard the waves subsided and all was well.



Fig. 3.—Buffalo Punch.

Circulation of Water in Steam Boilers.

The twenty-third edition of "Steam," just issued by the Babcock & Wilcox Company of New York and Glasgow, contains a valuable article by George H. Babcock on the above subject. This matter was first presented in a lecture at Cornell University. The article is as follows:

You have all noticed a kettle of water boiling over the fire, the fluid rising somewhat tumultuously around the edges of the vessel and tumbling toward the center, where it descends. Similar currents are in action while the water is simply being heated, but they are not perceptible unless there are floating particles in the liquid. These currents are caused by the joint action of the added temperature and two or more qualities which the water possesses.

1. Water, in common with most other substances, expands when heated; a statement, however, strictly true only when referred to a temperature above 39° F. or 4° C., but as in the making of steam we rarely have to do with temperatures so low as that, we may, for our present purposes, ignore that exception.

2. Water is practically a non-conductor of heat, though not entirely so. If ice-cold water was kept boiling at the surface the heat would not penetrate sufficiently to begin melting ice at a depth of 3 inches in less than about two hours. As, therefore, the heated water cannot impart its heat to its neighboring particles, it remains expanded and rises by its levity, while colder portions come to be heated in turn, thus setting up currents in the fluid.

Now, when all the water has been heated to the boiling point corresponding to the pressure to which it is subjected, each added unit of heat converts a portion, about 7 grains in weight, into vapor, greatly increasing its volume; and the mingled steam and water rises more rapidly still, producing ebullition such as we

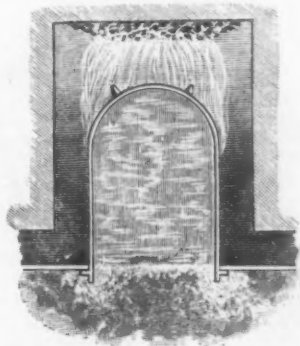


Fig. 1.

have noticed in the kettle. So long as the quantity of heat added to the contents of the kettle continues practically constant the conditions remain similar to those we noticed at first, a tumultuous lifting of the water around the edges, flowing toward the center and thence downward; if, however, the fire be quickened, the upward currents interfere with the downward and the kettle boils over, Fig. 1.

If now we put in the kettle a vessel somewhat smaller, Fig. 2, with a hole in the bottom and supported at a proper distance from the side so as to separate the upward from the downward currents, we can force the fires to a very much greater extent without causing the kettle to boil over, and when we place a deflecting plate, so as to guide the rising column toward the center, it will be almost impossible to produce that effect. This is

the invention of Perkins in 1831, and forms the basis of very many of the arrangements for producing free circulation of the water in boilers which have been made since that time. It consists in dividing the currents, so that they will not interfere each with the other.

But what is the object of facilitating the circulation of water in boilers? Why

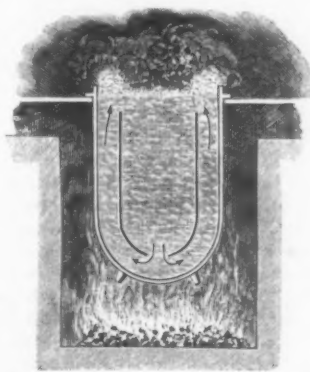


Fig. 2.

may we not safely leave this to the unassisted action of nature as we do in culinary operations? We may, if we do not care for the three most important aims in steam-boiler construction—namely, efficiency, durability and safety—each of which is more or less dependent upon a proper circulation of the water. As for efficiency, we have seen one proof in our kettle. When we provided means to preserve the circulation, we found that we could carry a hotter fire and boil away the water much more rapidly than before. It is the same in a steam boiler. And we also noticed that when there was nothing but the unassisted circulation, the rising

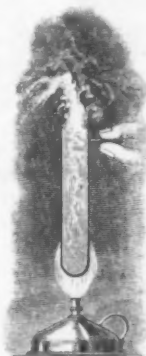


Fig. 3.

steam carried away so much water in the form of foam that the kettle boiled over, but when the currents were separated and an unimpeded circuit was established, this ceased, and a much larger supply of steam was delivered in a comparatively dry state. Thus circulation increases the efficiency in two ways—it adds to the ability to take up the heat and decreases the liability to waste that heat by what is technically known as priming. There is yet another way in which, incidentally, circulation increases efficiency of surface, and that is by preventing in a greater or less degree the formation of deposits thereon. Most waters contain some impurity which, when the water is evaporated, remains to incrust the surface of the vessel. This incrustation becomes very serious sometimes, so much so as to almost entirely prevent the transmission of heat from the metal to the water. It is said that an incrustation of only $\frac{1}{4}$ inch will cause a loss of 25 per cent. in efficiency, and that is probably within the truth in many cases. Circulation of water will not prevent incrustation altogether, but it lessens the amount in all waters, and almost entirely

so in some, thus adding greatly to the efficiency of the surface.

A second advantage to be obtained through circulation is durability of the boiler. This it secures mainly by keeping all parts at a nearly uniform temperature. The way to secure the greatest freedom from unequal strains in a boiler is to provide for such a circulation of the water as will insure the same temperature in all parts.

3. Safety follows in the wake of durability, because a boiler which is not subject to unequal strains of expansion and contraction is not only less liable to ordinary repairs, but also to rupture and disastrous explosion. By far the most prolific cause of explosions is this same strain from unequal expansions.

Having thus briefly looked at the advantages of circulation of water in steam boilers, let us see what are the best means of securing it under the most efficient conditions. We have seen in our kettle that one essential point was that the currents should be kept from interfering with each

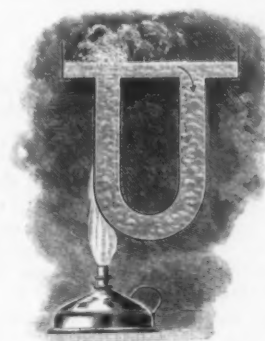


Fig. 4.

other. If we could look into an ordinary return tubular boiler when steaming we should see a curious commotion of currents rushing hither and thither, and shifting continually as one or the other contending force gained a momentary mastery. The principal upward currents would be found at the two ends, one over the fire and the other over the first foot or so of the tubes. Between these the downward currents struggle against the rising currents of steam and water. At a sudden demand for steam or on the lifting of the safety valve, the pressure being slightly reduced, the water jumps up in jets at every portion of the surface, being lifted by the sudden generation of steam throughout the body of water. You have seen the effect of this sudden generation of steam in the well-known experiment with a Florence flask, to which a cold application is made while boiling water under pressure is within. You have also witnessed the geyser-like action when water is boiled in a test tube held vertically over a lamp, Fig. 3.

If now we take a U tube depending from

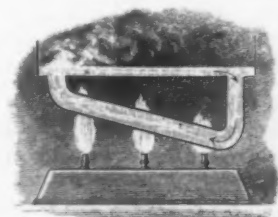


Fig. 5.

a vessel of water, Fig. 4, and apply the lamp to one leg a circulation is at once set up within it, and no such spasmodic action can be produced. This U tube is the representative of the true method of circula-

tion within a water-tube boiler properly constructed. We can, for the purpose of securing more heating surface, extend the heated leg into a long incline, Fig. 5, when we have the well-known inclined-tube generator. Now, by adding other tubes we may further increase the heating

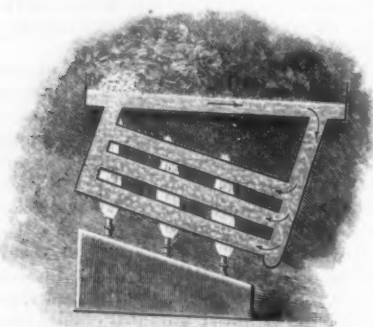


Fig. 6.

surface, Fig. 6, while it will still be the U tube in effect and action. In such a construction the circulation is a function of the difference in density of the two columns. Its velocity is measured by the well known Torricellian formula, $V = \sqrt{2gh}$, or, approximately, $V = 8 \sqrt{h}$, h being measured in terms of the lighter fluid. This velocity will increase until the rising column becomes all steam, but the quantity or weight circulated will attain a maximum when the density of the mingled steam and water in the rising column becomes one-half that of the solid water in the descending column, which is nearly coincident with the condition of half steam and half water, the weight of the steam being very slight compared to that of the water.

It becomes easy by this rule to determine the circulation in any given boiler built on this principle, provided the construction is such as to permit a free flow of the water. Of course every bend detracts a little and something is lost in

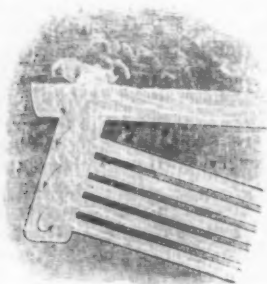


Fig. 7.

getting up the velocity, but when the boiler is well arranged and proportioned these retardations are slight.

Let us take for example one of the 240 horse-power Babcock & Wilcox boilers here in the university. The height of the columns may be taken as $4\frac{1}{2}$ feet, measuring from the surface of the water to about the center of the bundle of tubes over the fire, and the head would be equal to this height at the maximum of circulation. We should therefore have a velocity of $8 \sqrt{4\frac{1}{2}} = 17.97$, say 18 feet per second. There are in this boiler 14 sections, each having a 4-inch tube opening into the drum, the area of which (inside) is 11 square inches, the 14 aggregating 154 square inches, or 1.07 square feet. This multiplied by the velocity, 17.97 feet, gives 19.18 cubic feet mingled steam and water discharged per second, one-half of which, or 9.59 cubic feet, is steam. Assuming this steam to be at 100 pounds gauge pressure, it will

weigh 0.258 pound per cubic foot. Hence 2.47 pounds of steam will be discharged per second, and 8907 pounds per hour. Dividing this by 30, the number of pounds representing a boiler horse-power, we get 296.9 horse-power, about 23 per cent. in excess of the rated power of the boiler. The water at the temperature of steam at 100 pounds pressure weighs 56 pounds per cubic foot, and the steam 0.258 pound, so that the steam forms but $\frac{1}{218}$ part of the mixture by weight, and consequently each particle of water will make 218 circuits before being evaporated when working at this capacity and circulating the maximum weight of water through the tubes.

It is evident that at the highest possible velocity of exit from the generating tubes nothing but steam will be delivered, and there will be no circulation of water except to supply the place of that evaporated. Let us see at what rate of steaming this would occur with the boiler under consideration. We shall have a column of steam, say 4 feet high on one side and an equal column of water on the other. Assuming, as before, the steam at 100 pounds and the water at same temperature, we will have a head of 866 feet of steam and an issuing velocity of 235.5 feet per second. This multiplied by 1.07 square feet of opening and 3600 seconds in an hour gives 218,600 pounds of steam, which, though only one-eighth the weight of mingled steam and water delivered at

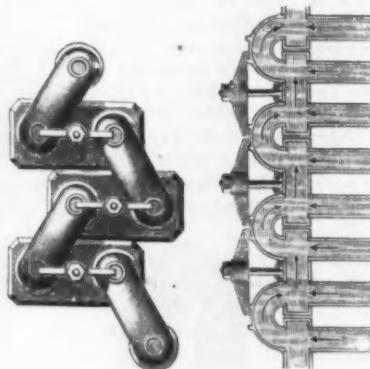


Fig. 8.—Developed to show Circulation.

the maximum, gives us 7286 horse-power, or over 30 times the rated power of the boiler. Of course this is far beyond any possibility of attainment, so that it may be set down as certain that this boiler cannot be forced to a point where there will not be an efficient circulation of the water. By the same method of calculation it may be shown that when forced to double its rated power, a point rarely expected to be reached in practice, about two-thirds the volume of mixture of steam and water delivered into the drum will be steam, and that the water will make 110 circuits while being evaporated. Also that when worked at only about one-quarter its rated capacity, one-fifth of the volume will be steam, and the water will make the rounds 870 times before it becomes steam. You will thus see that in the proportions adopted in this boiler there is provision for perfect circulation under all the possible conditions of practice.

In designing boilers of this style it is necessary to guard against having the uptake at the upper end of the tubes too large, for if sufficiently large to allow downward currents therein, the whole effect of the rising column in increasing the circulation in the tubes is nullified, Fig. 7. This will readily be seen if we consider the uptake very large—when the only head producing circulation in the tubes will be that due to the inclination of each tube taken by itself. This objection is only overcome when the uptake is so small as to be entirely filled with the ascending current of mingled steam and

water. It is also necessary that this uptake should be practically direct, and it should not be composed of frequent enlargements and contractions. Take, for instance, a boiler well known in Europe, copied and sold here under another name. It is made up of inclined tubes secured by pairs into boxes at the ends, which boxes are made to communicate with each other by return bends opposite the ends of the tubes. These boxes and return bends form an irregular uptake, whereby the steam is expected to rise to a reservoir above. You will notice, Fig. 8, that the upward current of steam and water in the return bend meets and directly antagonizes the upward current in the adjoining tube. Only one result can follow. If their velocities are equal, the momentum of both will be neutralized and all circulation stopped, or if one be stronger, it will cause a back flow in the other by the amount of difference in force, with practically the same result.

In a well-known boiler, many of which

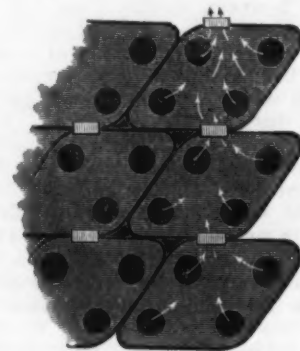


Fig. 9.

were sold, but of which none are now made and very few are still in use, the inventor claimed that the return bends and small openings against the tubes were for the purpose of "restricting the circulation," and no doubt they performed well that office; but excepting for the smallness of the openings they were not as

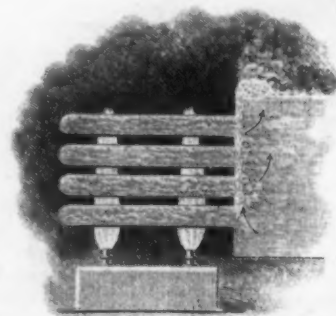


Fig. 10.

efficient for that purpose as the arrangement shown in Fig. 8.

Another form of boiler, first invented by Clarke or Crawford, and lately revived, has the uptake made of boxes, into which a number, generally from two to four, of tubes are expanded, the boxes being connected together by nipples, Fig. 9. It is a well-known fact that where a fluid flows through a conduit which enlarges and then contracts the velocity is lost to a greater or less extent at the enlargements, and has to be gotten up again at the contractions each time, with a corresponding loss of head. The same thing occurs in the construction shown in Fig. 9. The enlargements and contractions quite destroy the head and practically overcome the tendency of the water to circulate.

A horizontal tube stopped at one end, as shown in Fig. 10, can have no proper circulation within it. If moderately driven,

the water may struggle in against the issuing steam sufficiently to keep the surfaces covered, but a slight degree of forcing will cause it to act like the test tube in Fig. 3, and the more there are of them in a given boiler the more spasmodic will be its working.

The experiment with our kettle, Fig. 2, gives the clew to the best means of promoting circulation in ordinary shell boilers. Steenstrup or Martin and Galloway water tubes placed in such boilers also assist in directing the circulation therein, but it is almost impossible to produce in shell boilers by any means the circulation of all the water in one continuous round, such as marks the well-constructed water-tube boiler.

As I have before remarked, provision for a proper circulation of water has been almost universally ignored in designing steam boilers, sometimes to the great damage of the owner, but oftener to the jeopardy of the lives of those who are employed to run them. The noted case of the Montana and her sister ship, where some \$300,000 was thrown away in trying an experiment which a proper consideration of this subject would have avoided, is a case in point; but who shall count the cost of life and treasure not, perhaps, directly traceable to, but, nevertheless, due entirely to, such neglect in design and construction of the thousands of boilers in which this necessary element has been ignored?

OUR COPPER RESOURCES—III.*

BY JAMES DOUGLAS, NEW YORK CITY.

Conclusion.

When we turn from a review of our present sources of production to the consideration of our ultimate resources, we wander at times from the domain of fact into the borderland of fancy.

In the Appalachian chain from Vermont to Georgia there are imbedded in the crystalline schists large masses of pyrites, some consisting of ordinary bisulphide of iron, but most of them of pyrrhotite, and all carrying more or less copper. In the North they are less conspicuous than in the South, where, in the absence of denudation, rock decay extends to a considerable depth, and the existence of the ore masses is indicated by an oxidized iron cap. In Vermont, as already mentioned, the Ely mine was an important producer between 1854 and 1882. In Maine, copper-bearing pyrites-beds have been worked in two widely separated districts. New Hampshire has always produced a little copper. The Ore Knob mine in North Carolina yielded largely between 1873 and 1882. In Tennessee, the Ducktown mines produced annually more copper than any single Lake mine between 1852 and the advent of the Calumet and Hecla in 1866. Like all sulphuret mines, they became poorer as depth was attained. The Tallapoosa mine, in Georgia, was worked for several years, shipping its pyrites to phosphate works in Atlanta, Ga., where the copper was extracted from the cinder in the wet way. The Stone Hill mine in Alabama yielded a much higher grade of copper ore. There are very large masses of pyrrhotite in Carroll County, Virginia, which, despite its inferior sulphur contents, will sooner or later be used for acid making, and then made to yield up their very small percentage of copper. Considerable quantities of bisulphide of iron are mined near Charle-mont, Mass., and in Louisa County, Va., but neither deposit carries any appreciable amount of copper. The Liberty and other

mines in Maryland, as well as the copper-bearing slates and sandstones of Pennsylvania and New Jersey, are lying idle. At the present moment, therefore, the Atlantic States yield virtually no copper, and there is no reason to suppose that they will ever become large producers, inasmuch as they contain no bodies of pyrites comparable in size or in composition to even the smaller Iberian ore masses.

Turning to the Lake region, the case is very different. The larger of the existing mines will, doubtlessly, extend their capacity for production, and new mines will probably be more rapidly opened than the old ones will decay. There is only one mine in the country whose actual contents can be even guessed at. I refer, of course, to the Calumet and Hecla. Its ground has been explored laterally almost to its limits, and by its deepest workings, as well as by the exploration of the Tamarack Company, the value of its principal block of ground on the dip has been determined. Of course, there may be large tracts of unproductive vein within the area thus partially explored, which may, to some extent, impugn Mr. Agassiz's assumption that there exists within the Calumet and Hecla territory sufficient copper to last for 40 years at twice the present rate of production. At what rate the administration may see fit to extract that definite quantity, depends simply on the use which they wish to make of money, and of the appliances which money can furnish for extracting, transporting and refining their ores. The Tamarack has no known means of ascertaining to what depth this same rich chute extends, but it is reasonable to assume that the depth of the ore bodies included in the Keweenaw rocks bears some relation to their length, and is, therefore, not illimitable. Outside of the Calumet and Hecla ore chute, the Quincy is the only mine whose ore is rich enough to sensibly affect future production in case the administration should deem it wise to increase the capacity of its new mill. But the Keweenaw rocks extend beyond Michigan through the northwestern part of Wisconsin into Minnesota, where I have seen them carrying small quantities of metallic copper, associated, strange to say, with sulphides of iron and copper. Metallic copper has been mined, though unprofitably, in Douglass County, Wisconsin, and salable quantities of copper have been found as float in the drift in Wisconsin. But the outcrop of the Keweenaw rocks, both in Wisconsin and Minnesota, is generally so heavily covered with forest and swamp, that the discovery of copper in those regions will obviously be slow. In Michigan itself there is an almost boundless area of very lean amygdaloid and conglomerate rock, which will yield about $\frac{1}{2}$ per cent. of copper, and will, therefore, attract mining only when a high range of prices is assured, for the starting of a Lake mine and the erection of the plant necessary to the economical treatment of the ore is a costly enterprise.

Thus we may count on a gradual but considerable increase of copper from the larger existing Lake mines. It is also reasonable to suppose that new mines will be opened, and that if the price be tempting, abandoned mines will be revived. At present, the price of the metal determines the activity of most of the smaller mines. During the late depression the cost of production in many cases hovered dangerously near the figures at which copper was sold.

Beyond the Lakes lies the West—a wide and but partially explored domain. Looking at the existing mines, it is hardly probable that those of Arizona will greatly extend their production, though in none is there any sign of exhaustion. They do not grow richer with growing depth, and it is safe to presume that when the oxidized ores, including the oxisulphurets, give place to unaltered sulphurets, the

latter will be leaner than the superjacent layers. In Butte the extensive surface ground owned by the Chambers syndicate, and the Boston and Montana, and Butte and Boston companies probably cover undeveloped bodies of rich surface ores. When the ravages of the fire in the Anaconda have been repaired, she will resume her former production; and the new work of the Boston and Montana Company at Great Falls, Mo., will enable that company to increase their output. For a time, therefore, we may look for augmented production from Butte. But sooner or later even her output will decline by reason of the notable debasement which the deeper Butte ores undergo in common with the sulphuret of all copper veins. If a given standard of production is to be maintained, a corresponding expansion of plant will be required, and this in time will create unwieldy and unprofitable establishments. The resources of Butte are enormous, but they are drawn upon with lavish prodigality, and like everything else on the earth, even including copper mines, they are not inexhaustible.

So much for the principal centers of active mining. As for the undeveloped riches of our West, it is to be borne in mind that although this wide expanse of territory has not been thoroughly explored, there are few districts which have not been superficially prospected. For 40 years a large army of active and sanguine men have been marching back and forth over every obstacle, and in every season, traversing the Rocky Mountains from East to West, and from North to South, in search of hidden treasure. That their search long ago was very thorough is being revealed evermore clearly by the rarity of the occasions on which fresh discoveries of large bodies of any metalliferous mineral are made at the present day. And copper is a metal whose ores betray their presence by such characteristic and brilliant colors that they are not easily overlooked, especially in a country whose naked mountain ranges are riven and deeply scored by the elements. Some new discoveries of large deposits are sure to be made, but they will be infrequent. It must be remembered that ten years have elapsed since the railroads gave access to Montana and Arizona, and led to the active development of the large mines in those sections that had been already discovered; and that despite the construction in the interval, of other through lines and ramifying branches, no large deposit that was then unknown has been opened since. But while the copper world is not destined to be startled often by the apparition of an Anaconda mine, we have no cause to fear a dearth of copper even when the large mines now known have been exhausted. In every State and Territory of the Rocky Mountains we know of an abundance of low-grade ores which will help us to maintain our supremacy in the ranks of producers when they become available by the growth of population, the cheapening of fuel and labor, and the application of still better metallurgical methods.

There extends through Northwestern Texas, Northern New Mexico and Northern Arizona a belt of Permian sandstone carrying nodules of rich ore and immense quantities of low-grade ore, which at some future day will be utilized. The San Pedro mine in that section of New Mexico has figured at intervals as an important producer. In the Santa Rita district of Southern New Mexico large deposits of ore were once extensively worked. In the Clifton district, as indeed throughout great tracts of Southwestern Arizona, the very rocks are tinted green with copper; but the copper is associated with so much alumina and silica, and is so lean that to-day it cannot be profitably treated. Nor are these the only undeveloped deposits of

*Read at the New York meeting of the American Institute of Mining Engineers.

Arizona which simply await favorable conditions for exploitation. In the State of California large beds of low-grade, sulphureted ores occur in Calaveras and Nevada Counties, which beside promising a valuable yield of copper, will prove a most desirable auxiliary to California's future chemical industry. Passing to Nevada there are large deposits of low-grade ores in Esmeralda County, and ores of higher grade are reported to exist north of the line of the Central Pacific Railroad. Utah now contributes some copper, and Idaho will undoubtedly contribute much more than at present. She has copper deposits on the Lost River, and still more extensive deposits in the Seven Devils district on the Snake River, which, if nearer the railroad, would now be furnishing their quatum to the common stock. Oregon has unworked copper mines. The copper of Montana is not confined to Butte, nor are the States of Wyoming and Colorado barren. Taking into account the wide area over which we find copper, and the casualties of mining, which if they generally bring misfortune, yet occasionally bless us with unexpected luck, we may allay all alarm of famine while dispelling any apprehension of a deluge. But we should understand that the great bulk of our undeveloped copper cannot be made available without a favorable price, and that only by drawing on these reserves can our own and the world's requirements be met. It will require a greatly increased production either from existing mines or new ones, to supply the world's ravenous demand for copper—a demand that springs from many new applications of the metal as well as from increased consumption for old ones.

The following table exhibits the rate of copper consumption in the United States since 1850:

Year.	Population.	Consumption in tons of 2000 pounds.	Consumption per head. Pounds.
1850.....	23,191,876	6,710	0.550
1860.....	31,443,321	7,116	0.405
1870.....	38,558,371	12,342	0.608
1880.....	50,155,703	26,799	1.006
1889.....	61,000,000	34,800	2.736

The per capita decline between 1850 and 1860 is probably attributable in part to the introduction of iron in shipbuilding and the consequent abandonment of copper sheathing, and partly to the financial disturbance which reached its extreme depression toward the close of the decade. Electricity may be credited with creating an extraordinary demand within the last few years, but it had no part in raising the per capita consumption so steadily between 1860 and 1880. This was due to the growing wealth of the people which stimulated the demand for fine metal work in architectural construction and decoration. A pro rata increase of consumption during the coming decade may not be maintained, though no good reason for a falling off can be alleged. The present applications of electricity are few compared with its future uses, and although we may expect to see copper economized by the discovery of new methods for reducing the size of conductors, there is no probability that any other metal will supplant copper in the construction of dynamos or in the distribution of electrical energy. The necessity for sheathing iron vessels is most keenly felt, now that speed is becoming the supreme consideration both in mercantile and naval marines, and we may therefore almost count upon the discovery of a successful method for effecting it. Such a discovery would

naturally exert a potent influence on the balance between supply and demand. For ordinary household purposes copper will certainly hold its own, for even though aluminum should be produced as cheaply as copper, it would not displace bronze and brass, with their capacity for artistic treatment in color and form. If the growth of our population during the next ten years continues at the same rate as for the past decade, and the per capita increase of consumption is maintained, it will require in the year 1900 over 300,000 short tons of copper to satisfy the demands of this country alone, or about 75 per cent. of the world's present annual production.

The importance of the copper interests of the country as industrial enterprises is much greater than is ordinarily supposed. Without pretending that they rival the iron and steel industries as a national necessity, they bear no insignificant comparison with them. If we assume that the average of all copper ores treated carries 3½ per cent. of metal (and this is above rather than below the true average), and that our production of metallic copper in 1889 was 241,600,000 pounds, this would represent the mining of 3,451,000 tons of copper ore, as against an annual production of 12,000,000 tons of iron ore, or about 28 per cent. The metallurgical treatment of copper, and more especially of the sulphuretted ores, involves heavier costs in labor, fuel and material than the treatment of iron, and most of the subsequent manipulation of the metal in converting it into manufactured forms is more intricate. The comparative importance of the two metals in the national balance sheet, therefore, is not to be estimated not so much by the respective weight of the finished products as by the relative amount of raw material and labor used in creating them.

Coal Product of the Far West.

(Concluded from page 692, April 9.)

Texas.—The principal body of bituminous coal in Texas lies in the northern central portion of the State, extending southwest from the Red River, in Montague County, to the Colorado River. This basin is a continuation of the great Fourth or Western field, of which it forms the southern extremity. It is said to underlie the whole or portions of 25 counties, and embraces an area of 12,000 square miles. The field next in importance in this State lies along the Rio Grande, underlying Webb, Dimmit, Zavalla, Uvalde, Medina and Maverick counties, known as the Nueces coal field, and embraces about 3700 square miles. The quality here is variable, differing materially from that of the Central field, the lower measures yielding a fair semi-bituminous product, while the upper measures are somewhat lignitic. The principal developments in this field are at Santa Tomas, in Webb County, and at Eagle Pass, in Maverick County.

An extended area, bounded by lines drawn from Clarksburg, in Red River County, southwesterly to the Rio Grande, and thence northeast to the Sabine River, in Sabine County, is said to contain important deposits of lignite.

The total quantity of coal of all grades mined in Texas during the year 1889 was 128,216 short tons, valued at \$340,617 at the mines. The average number of persons employed during the year was 549, and the amount of wages paid \$256,834.

Rocky Mountain Region.—The coal deposits in what is known as the Rocky Mountain region are embraced in Colorado, Wyoming, Montana, Utah and New Mexico. Although indications of lignite deposits have been found in Nevada, Idaho and Arizona, no effort at development has yet been made beyond desultory prospect-

ing. Lignite, bituminous and anthracite coals are found in the region under consideration. The latter, however, so far as known, is confined to Gunnison and Pitkin counties, in Colorado, and the quality is said to compare favorably with the anthracite of Eastern Pennsylvania. The bituminous coals comprise some excellent qualities of coking and gas coals. During the decade since the tenth census the development of coal mining in the States and Territories named has been intelligently and vigorously prosecuted, mainly through the instrumentality of the great transcontinental railroad interests. The output increased from about 1,000,000 tons during the census year ending June 30, 1880, to nearly 5,000,000 tons in 1889. The product is consumed largely within the States and Territories in which it is mined, although, through the constantly increasing facilities for transportation, good markets are being reached in the adjoining States, both east and west.

The coal districts in the Rocky Mountain region embrace large areas in Montana, Utah, Wyoming, Colorado and New Mexico.

California.—Although coal deposits of more or less importance have been discovered in many of the counties of the State west of the Sierras from Siskiyou, in the vicinity of Mount Shasta, in the north, to San Diego in the south, no mining operations upon a commercial scale have been prosecuted except in Amador and Contra Costa counties. Coal was discovered in the Mount Diablo district in 1852, but productive mining was not prosecuted until after the year 1860. This district now furnishes the major portion of the product of the State. The coals of California, so far as at present known, are all lignitic in character, generally inferior to the coals of Washington and Oregon, and cannot compete with the better coals supplied by sea from British Columbia and Australia.

The total product of coal in California during the calendar year 1889 was 121,820 short tons, valued at \$288,232, showing an average price of \$2.31 per ton at the mines. The average number of persons employed during the year was 283, and the total wages paid \$169,649.

Considerable interest has been manifested in recent years in the subject of an adequate fuel supply for the increasing demands of the State, which has resulted in more determined and well-directed research. From the reported recent discoveries of coal beds in various sections of the State the belief exists that the time is not far distant when California will cease to be dependent upon foreign coals for its requirements.

The fuel supply of California has been derived during the year 1889 from British Columbia, Australia and Japan, England, Scotland and Wales, Eastern anthracite and bituminous, Washington, Mount Diablo and Coos Bay, aggregating 1,351,957 short tons.

Oregon.—Outcroppings of coal have been found in 19 counties in the State of Oregon both east and west of the Cascade range, but mining operations are reported only in Coos County. These mines are located at Marshfield, on Coos Bay. The Coos County field is claimed to cover an area of several hundred square miles and is a fair quality of lignite. The product is shipped mainly to San Francisco.

Washington.—The mining of coal in the State of Washington began about the year 1850-51 in the field in the vicinity of Bellingham Bay, in the extreme northwestern part of the Territory, but operations there were discontinued in 1879, and have not been resumed. Several important coal areas have since been opened up both on the western and eastern slopes of the Cascade range, the most important of which are in the vicinity of

Puget Sound, in King, Pierce and Thurston counties, and in Yakima County, near the Attanum River. Outcroppings have been found in other localities, notably at Ellensburg and in Lincoln and Spokane counties, and also in White Salmon River, in Cascade County. The coals of the State embrace lignite, semi-bituminous and bituminous varieties, adapted for coking, gas, steam and domestic purposes. Some specimens of a very fine grade of coal resembling anthracite are reported as having been taken from Cowlitz Pass, in Yakima County. The total area of the coal deposits of Washington has not yet been fully determined, but there is no doubt that almost inexhaustible supplies are at hand, not only for the future demand of its own population, but sufficient to furnish a basis for profitable traffic for transportation to the entire Pacific Coast. The total product for the calendar year 1889 was 993,724 short tons, valued at \$2,203,755, showing an average of \$2.22 per ton at the mines. The average number of persons employed was 1847, and the total amount of wages paid was \$1,155,238.

The aggregate results are: Regular establishments, 569; country banks and local mines, 1326; total product, 16,067,500 short tons; loaded at mines for shipment on railroad cars or boats, 14,155,650 tons; used by local employees and sold to local trade, 1,270,300 tons; used for steam and heat at mines, 320,088 tons; made into coke, 321,462 tons. Value of total product at mines, \$24,413,262; average price per ton, \$1.53; wages, \$17,156,395; persons employed, 36,163.

Making Buildings Fire Proof.

Representatives of the American Institute of Architects, the National Association of Builders, the National Association of Building Inspectors, the National Board of Underwriters and the National Association of Fire Engineers met in this city last week, at the invitation of the Executive Committee of the last-named body, to form a model building ordinance. After discussion the following recommendations were endorsed:

While special detail codes, varying according to circumstances, though based on the State law, would probably be required for the larger cities, the general law of universal application throughout the State should, in the opinion of your sub-committee, provide:

1. That all buildings over 70 feet in height be constructed throughout of incombustible materials, protected in the most approved manner for resisting fire.

2. That interior structural iron work in all buildings be covered and protected by fire-proof material.

3. That all buildings over 50 feet in height be furnished with permanent stand pipes and ladders for the assistance of the fire department.

4. That the height of buildings to be erected should not be more than 2½ times the width of the principal street on which they are located, and that no building or portion of a building, except church spires, should be more than 125 feet high in any case, except under special permit.

5. That the open floor space not divided by walls of brick or other incombustible material, in all buildings hereafter erected for mercantile or manufacturing purposes, should not exceed 6000 square feet without special permission based upon unusual and satisfactory precautions.

6. That every building which shall be three stories high or more—except dwelling houses for one family—and which shall cover an area of more than 2500 square feet, should be provided with incombustible staircases, inclosed in brick

walls, at the rate of one such staircase for every 2500 feet in area of ground covered.

7. That wooden buildings erected within 18 inches of the boundary line of the adjoining property should have the wall next to the adjoining property of brick; or, when built within 3 feet of each other, shall have the walls next to each other of brick.

MAGNETIC ORE SEPARATION.

THE TESTS OF WITHERBEES, SHERMAN & CO.

Witherbees, Sherman & Co., of Port Henry, N. Y., are carrying through a series of tests at their mines at Mineville, N. Y., which are destined to be of the greatest importance, not only to them in their great enterprises, but also to the Eastern iron trade generally. It is a curious fact that more than a generation since magnetic separation was experimented with in the district which is now foremost in the work, and which is sure to be greatly benefited by it.

The question is arousing deep interest among the ore miners and pig producers, and has brought about an unusual activity among inventors, some of whom are rapidly acquiring accurate knowledge of the conditions and limitations of the work. Magnetic separation is now being introduced or experimented with at a number of points in the belt of magnetite deposits which extends southward from the Adirondacks through New Jersey and Eastern Pennsylvania. Excellent work is being done at the Cheever mines at Croton, N. Y. A mill of considerable capacity is running at the Benson mines, Little River, N. Y. At the Ogden mines, near Dover, N. J., the Edison machine has just been started in an extensive plant, under adverse conditions. The Conkling machine is being used at the Tilly Foster mine, near Brewsters, and has been adopted to treat the tailings of the Chateaugay mill near Plattsburg, N. Y. At R. Heckscher & Co.'s Weldon mines, in New Jersey, the machine of a Chicago inventor is being experimented with. But the most exhaustive and most thoroughly conducted experiment yet undertaken is now in progress at the mines of Witherbees, Sherman & Co., at Mineville, N. Y., under the supervision of John Birkinbine of Philadelphia.

Enough has been done thus far to conclusively settle at least one point, and that is that it is possible to make available profitably ore thus far considered too lean to be marketable. In some cases, like that of the Cheever mines, the deposits yield so little high grade rock that separation is necessary to make them at all workable. In other cases, and they embrace the majority of mines, a large amount of lean ore must be broken and in some instances be raised to the surface to reach or to extract the shipping ore. A considerable outlay is thus incurred, which adds seriously to the cost of putting shipping ore into cars. If the pure ore can be relieved of this burden and the lean ore be utilized, even at a very close margin, costs are reduced all around.

Underlying the whole problem of making available individual deposits is the broader aim to place at the disposal of Eastern pig-iron makers an ore so cheap that its use counterbalances the disadvantage of high fuel cost. That only can save the plants located at a distance from the fuel, near the ore and near the markets, from the fate of succumbing to the competition of rivals located in the West and South. If, for instance, concentrates could be placed on the Hudson River at \$4 to \$4.50, where coke is available at \$4 and anthracite at

\$3.50 to \$3.75, then the pig industry of that valley, now in rapid decay, can continue to live.

Witherbees, Sherman & Co. first began work with a small plant at Mineville. The encouraging results obtained, both from a technical point of view and commercially, led to the building of a larger works. The problems presented in the Port Henry district are twofold: 1, to produce from lean Bessemer ore concentrates high in iron; and, 2, to make from rich ores, high in phosphorus, stock fit for use in the manufacture of Bessemer pig iron. In either case the difference in price realized is considerable.

General Considerations.

The success of magnetic separation, aside from the completeness and speed with which the work is performed by the magnetic machines themselves, depends primarily on the character of the ore. The principal item of cost is its preparation for the final act of separation. The requirements to be met are that the ore be crushed so fine that the great majority of the particles of the different minerals constituting it be free from adhering particles of the other minerals. The ore must be fairly uniform in size, and it must be dry so that the utmost freedom of movement of individual particles is secured. The principal item of cost is the crushing and the screening. It varies naturally with the character of the ore. If it is friable, if it is an aggregate of coarse particles of the constituent minerals, then the cost will be lower, and a given plant will handle a maximum product with correspondingly low general cost per ton, low cost for power and repairs, and low losses. If the ore is a close mixture and hard, if it is lean, then the cost rises rapidly. The choice of the crushing apparatus naturally has its great influence. Under certain conditions it may be expedient to work for quantity, the quality of the crushed material from the standpoint of the concentrator being a matter of minor consideration. Under other conditions it may be wise to sacrifice some advantages in the quantity of stuff crushed to the necessity of supplying to the magnetic machines material as closely as possible approaching ideal conditions.

It will be readily understood that only tentative experimental effort can determine the best conditions for each individual ore. Witherbees, Sherman & Co., realizing this fully, have built their mill, utilizing machinery in their possession, in such a way that it can be adapted to meet the teachings of the experiments which they are now carrying out on a commercial scale, the mill having been designed by John Birkinbine of Philadelphia, Pa.

The Mill.

The new mill is so located, in close proximity to the famous Old Bed mines of Witherbees, Sherman & Co., that the transportation of the ores from all their mines is down grade. The crude ore is dumped over a 2½-inch grizzly into the crusher house, all material above 2½ inches going to a 24-inch Buchanan crusher, while the finer material, if necessary, passes through a revolving horizontal dryer. The stuff from the crusher is delivered upon a conveyor belt which passes it to a second building in which is located a 1½-inch octagonal screen, the ore from the grizzly going with it also, by an elevator. The fines are delivered upon the same belt, upon which falls also the coarse from the same screen after it has been crushed in two Buchanan granulators. This conveyor belt conveys the crushed ore to the third or main building, in which it is delivered first to a screen with No. 6 mesh. The coarse is handled on a 20 x 36 inch set of Buchanan rolls, from which an elevator takes it to two screens placed high in the building, room being provided for a third screen; each building

of the series is located somewhat lower than the preceding one, and a feature of the design throughout has been to place all the heavy machinery on solid foundations. The plant is driven by an engine, which occupies a building with the boilers. The power is transmitted by wire rope to the crusher and to the concentrator buildings. The plant, as designed, is laid out for two sets of machinery, one for the treatment of New Bed lean (Bessemer) ore and one for Old Bed (non-Bessemer) ore. The former is now in place. The electrical power is provided by one small and one large Eickemeyer dynamos, driven by a small horizontal engine. The plant is equipped with six Wenstrom and one Buchanan separator, and at the time of the visit of the representative of *The Iron Age* contained also, for experimental purposes, one Wenstrom Michigan machine, a modification of the older form; one Ball & Norton Monarch machine, and one Payne separator. The latter, we may state, was specially built, at short notice, to enter the test, and is not regarded as embodying the best mechanical expression of the principles involved in the design. Running on New Bed lean, the concentrator, as completed, has developed a capacity of 175 tons of concentrates per day.

The Tests.

The tests are being carried on in a most comprehensive manner under the supervision of John Birkinbine, J. M. Sebenius being in charge of the mill. Their scope may be judged from the following blank, in which the results are entered. The analytical work is being done by T. R. Woodbridge of Port Henry. To date the series includes 50 different tests:

grown, and the dust. The middlings appear to entangle with them a certain quantity of fine pure magnetite, and it has been found that by screening them a rich product may be separated.

As already stated, Witherbees, Sherman & Co. are working in two directions, the enrichment of lean Bessemer ore and the elimination of phosphorus from rich ore high in phosphorus. The series of tests conducted thus far has embraced an examination of the effect of crushing to different sizes. Nos. 6, 10, 16 and 20 mesh, the working either for exceptionally rich concentrates or the preparation of the ore so that the loss in the tailings is reduced to a minimum. These tests have not yet been concluded. They embrace also a study of the relative work done by the different machines now at the mill. We present the following results as typical of the work being done, each of the machines which did work in the series being represented by one test:

Concentrating Lean Ore.

The following are the results obtained in the treatment by magnetic separators of different design on New Bed lean ore:

	I.	II.	III.
Volts	115	115	110
Amperes.....	34	104	12
Speed.....	22	40	120
Analysis: Iron. Phos. Iron. Phos. Iron. Phos.			
Crude ore.....	47.30	0.082	41.00
Concentrates.....	66.50	0.019	67.30
Tailings.....	37.00	6.20	0.183
Mugwump.....		46.90	0.040

	IV.
Volts	110
Amperes.....	9
Speed.....	40
Analysis: Iron. Phos.	
Crude ore.....	35.7
First concentrates.....	58.9
First tailings.....	21.6
Second concentrates.....	55
Second tailings.....	14.5

Separator Test No. 50.

WITHERBEES, SHERMAN & CO.

Mineville, New York,.....189..

Ore used.....	Mesh.....
Condition.....	Single.....
Machine used.....	Double.....
	Triple.....
Volts.....	
Amperes.....	
Speed.....	
Air blast employed.....	
Square foot magnetic surface of machine.....	
Square foot magnetic surface per minute.....	
Test commenced.....	Ended.....
Time lost.....	Cause.....
Actual duration of test.....	
Amount of crude ore used.....	
Amount of concentrate produced.....	
Amount of mugwump produced.....	
Amount of tailings produced.....	
Concentrate made per hour.....	
Concentrate made per minute per square foot magnetic surface.....	

ANALYSES.

Samples Marked	Iron	Phosphorus.
50 A, Crude ore.....		
50 B, 1st concentrate.....		
50 C, 1st tailings.....		
50 D, 2d concentrate.....		
50 E, 2d tailings.....		
50 F, Mugwump.....		
50 G, Dust.....		

The products of the treatment of the crude ore are the concentrates, the tailings, which is the non-magnetic matter, the middlings or "mugwump," as Mr. Birkinbine has designated them, which consist chiefly of particles in which magnetic and non-magnetic minerals are inter-

All these tests were carried through with ore crushed only to No. 6 mesh. No. II shows the effect of double treatment, while No. IV gives the results obtained by reworking the tailings. It will be noted that while the ore is enriched to an excellent shipping grade, its phos-

phorus contents are reduced both absolutely and relatively.

Bessemerizing Rich Ore.

The second series of tests was made with Old Bed non-Bessemer ore. The ore chosen was from the Joker pit, which is the worst on the property, speaking from the standpoint of the concentrator, since the phosphorus is highest and the ore is closely intergrown, making it mechanically difficult to handle for magnetic separation. Witherbees, Sherman & Co. feel convinced that if the machines can handle this rock they can convert any of the non-Bessemer ores in the district into Bessemer stock. We present the following analyses of products obtained from three of the magnetic separators running on No. 16 mesh Joker ore:

	I.	II.	III.
Volts	115	110	110
Amperes.....	24-3	34	124
Speed.....	40	75	40
Analysis: Iron. Phos. Iron. Phos. Iron. Phos.			
Crude.....	55.4	1.687	50.5
Concentr.....	69.5	0.284	70.5
Tails.....	14.0	6.516	6.0
Mugwump.....			50.10
Dust.....			1.280

It will be observed that while the ore has not been converted into what would be considered as classing with Bessemer, the phosphorus reduction is very heavy indeed, giving good grounds for the hope that with possibly closer crushing and even more careful concentration the result may be achieved.

An interesting effort goes hand in hand with these attempts and that is the discussion of the question whether it will not be possible to make the tailings available for phosphate manufacture and thus aid the process by the utilization of this by product. It is likely that the presence of magnetite in this product may not prove any detriment, because it is not attacked by the acids in the process of manufacturing superphosphates.

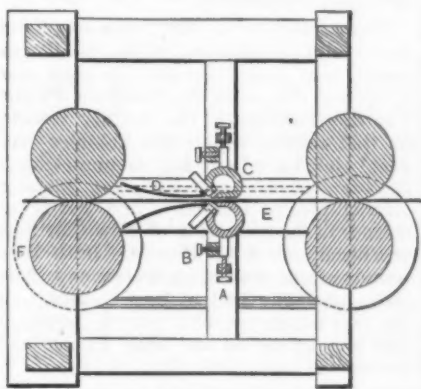
The United Forge Masters' Association, which consists of nine concerns making heavy shaped work, such as crankshafts and general machine and marine forgings, held their annual meeting at Cleveland, Ohio, on the 8th inst.

At a meeting of the Pittsburgh Committee of Freight Agents of the various lines leading into that city, held there on Friday, the 10th inst., the rail and lake rates for the season preliminary to the opening of navigation were established. The rates apply from Pittsburgh to St. Paul, Minneapolis, Stillwater, Minn. and intermediate points, and are as follows, per 100 pounds: For articles of the first class, 92½ cents; second class, 77½ cents; third class, 57½ cents; fourth class, 40 cents; fifth class, 32½ cents; sixth class, 28 cents. For articles of iron and steel manufacture the rate for less than carload lots is 32½ cents per 100 pounds and for carload lots 28 cents per 100 pounds. The new rates take effect on April 21, 1891.

The Pittsburgh and Allegheny Suspension Bridge Company, operating a suspension bridge across the Ohio River, from Sixth street, Pittsburgh, to Federal street, Allegheny, Pa., have decided to build a new structure during the coming summer, to cost from \$500,000 to \$700,000. The plans submitted some months ago by Gustave Lindenthal, a civil engineer, of Pittsburgh, have been accepted, and when finished the bridge will be one of the handsomest in the country. There will be four tracks, two for street cars and two for vehicles, and wide passageways for foot passengers. It is probable that the new bridge will be built on skids and put in place in sections, in the same manner that part of the Ohio connecting bridge was built.

Apparatus for Cleaning Sheet Iron.

In practice, after the rolling of the sheet iron has been completed, it is found to be tough, springy and elastic—qualities which must be removed before sending the article to market, as they would interfere with or perhaps wholly defeat the working up of the sheet into various articles. These qualities are destroyed by proper annealing, but the sheet becomes tarnished and sooty. To remove this shot and discoloration is desirable, as the saleability of the sheets is thereby increased. This has been done by a process of scrubbing with brushes, the sheets being made to pass under or be-



Apparatus for Cleaning Sheet Iron.—
Fig. 1.—Vertical Section.

tween revolving rubbers, which have to be renewed as they wear out or become clogged with soot.

The apparatus of which drawings are here presented was designed by Thomas G. Turner of 114 Liberty street, New York, for the purpose of cleaning the sheets by a jet of heated air or steam,

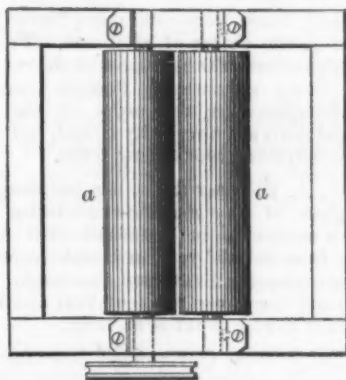


Fig. 2.—Elevation.

which strikes against the surface of the sheet at an angle of about 30°. The steam for this purpose is made as hot as possible, and the sheets are so highly heated that there is no danger of the dead steam condensing on them and causing rust. In the drawings, A is

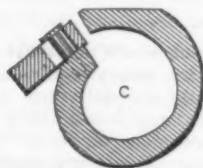


Fig. 3.—Enlarged Section of Steam Pipe.

the frame of the machine, in which are mounted in suitable yielding bearings the feed and delivery rolls *a a*, which are

driven in any convenient way, the motion of one set being imparted to the other by a belt. Between the rolls and on either side of the plane which passes between the meeting sides of both pairs is a steam pipe, C, more fully shown in Fig. 3. These pipes have a flattened side, so that they may be brought very close to the sheet E, and have a longitudinal slit, the width of which may be regulated as desired. This is done by causing the plate to approach or recede from the lip of the slit and securing it in place by the bolts, which pass through slots, as clearly shown. On the rear side of each pipe is an arm, against which bear two set screws, the one in a horizontal and the other in a vertical direction, whereby the distance of the pipe from the sheet and the angle of incidence of the steam jet may be altered as desired.

It is evident that as the sheet passes between the pipes both of its surfaces are subjected to the action of highly superheated steam, which thoroughly cleanses them. The sheets leave the rolls bright, clean, dry and ready for packing.

San Francisco News.

There has been no further disturbance of the peace by the molders or their friends during the past fortnight, and the foundrymen rest content. They avow themselves as thoroughly well satisfied with the present state of affairs, though it is easy enough to see that many of them regret the severance of the pleasant relations that subsisted for so many years between them and their workmen, and that they would be well pleased to see them back again at work as aforesaid, but the breach seems to be growing wider every day. The molders at the Pacific Rolling Mills have been ordered out and have gone out; they were working on the stern post of the new cruiser. It was being made for the Union Iron Works, a boycotted firm. The stern post will be obtained from the East, although somebody in the beginning averred that it could not come through the tunnels. The strike affects the rolling mills but little, as this was only a very small portion of their business. It is, however, a very unwise thing for the strikers, as it can do them no possible good, and as a vexatious measure will cost the sympathies of many. The molders have started to send their men East, and to find employment for them outside the city if possible, leaving here a sufficient number to continue the fight. This is doubtless a wise move, looking at the strike as over, but not from any other point of view. The molders have also started a boycott against the manufacturers of iron pillars, girders, &c., used in building. The bricklayers and the stone-cutters have taken it up, and agree that in future they will refuse to work on any buildings where boycotted iron is used.

There are but two firms, however, who make a specialty of this business, or who belong to the Foundrymen's Association, so that it would not affect the present business of the foundries much. As it would probably send a good deal of the business East, it is something that in the present condition of the foundry trade can hardly be looked upon with equanimity. Very great injury has been already inflicted on our iron industry, which could ill afford it, and which from present appearances will take some time, under favorable circumstances, before it can be restored to its flourishing condition of a few years back.

For some time past the tendency of the pig-iron market has been downward. Scotch and English pig iron of good makes and No. 2 American are offered to the foundries at \$26 to \$27, to arrive. Spot prices are about \$1 more. A year

ago the market was \$6 higher. Some fancy brands are quoted at a dollar or two more. The imports of merchant iron by rail and sea seem to be about the same as they were for the corresponding time in 1890. Those of tin plate are, however, much less, falling short about 80,000 boxes. Nearly one-half of all the imports of tin plate so far this year came to hand during the past week, 43,059 boxes by the Dawpool and the Lady Cairns, from Great Britain. As to prices, both in this line and pig tin, there is no change to record. The projected canners' syndicate—that is, the proposed purchase and capitalization of our leading fruit canneries by an English syndicate—is not looked upon by those who have tin plate to sell with a favorable eye. They believe they will not be able to sell to the same advantage, and brokers particularly regard it with but scant favor. Be that as it may, the prospect of the leading canneries pooling their issues in the manner noted is very good—in fact, it is reported that the deal has been already consummated. The probabilities are that the consumption of tin plate will be fully as large as in 1890, or about 375,000 boxes. This will, in future, be one of the largest departments of our trade in metals, and has grown with wonderful strides during the past few years. In 1873, 18 years ago, the importation was only 50,891 boxes, in 1880 only 154,682 boxes, and even as late as 1884 but 155,535 boxes. There is here, therefore, a great field for American tin plate manufacturers should the McKinley bill develop any permanent industry, and there is a great field for some enterprising man to start such a business in California with the development of our tin mines and the production of iron at a reasonably cheap rate. But there is the rub. Iron is manufactured on Puget Sound and to a small extent in Oregon, but not quite cheap enough. The development, for instance, of our sugar refining and shipbuilding interests in the face of adverse circumstances shows what could be done by a man of brains and capital and a full understanding of the business, even in the iron industry.

The hardware trade has hardly well started yet. The country trade is waiting for the later rains, as there is some complaint, though nothing serious. The sale of agricultural implements has received a slight check for the same reason.

The Scranton Steel Company of Philadelphia, Pa., filed a petition in the Circuit Court in Baltimore, Md., on Saturday, for a receiver for the Baltimore and Eastern Shore Railroad. The company allege that the railroad is indebted to them for steel rails to the amount of \$80,000.

A new steamship called the Costa Rica, for the Pacific Mail Line, was launched from Roach's yard at Chester 8th inst. She is 242 feet over all, with a beam of 36 feet. Her tonnage is 1560. She will be driven by triple-expansion surface-condensing engines. The high-pressure cylinder has a diameter of 20 inches; intermediate, 32 inches. The low-pressure cylinder is 50 inches in diameter, with a stroke of 36 inches. She is equipped with four steel boilers, 10 x 10 feet 2½ inches, with corrugated furnaces, having a working pressure of 160 pounds to the square inch.

Twenty-seven Baldwin locomotives were taken out last week by the British steamer Henly, from Philadelphia, for Sydney, New South Wales.

Hamburg's trade with America increased \$1,000,000 during the last three months compared with the same period in 1889.

THE WEEK.

Boards of Trade in the new Western States are organizing a company to render navigable the cascades in Columbia River, so that a quick route may be provided for the forwarding of crops to the sea.

Report says that another Clark Thread Company will be formed in Newark under control of seceders from the original concern, and that the striking spinners will be enabled to resume work.

It does not yet appear that the new subsidy law will have much effect in diverting the European mails from foreign vessels.

Chili's minister at Paris is said to have honored rebel drafts by drawing against money sent him to pay for the new cruisers built in Europe for that government.

The Boss Masons' Association of Jersey City resolved to employ pupils of the New York trade school to fill the places of striking bricklayers. Their services could be had, it was stated, at \$1.50 a day. Non-union journeymen were offered \$1.05 per day, the wages paid heretofore.

The Knights of Labor soundly belabor the State Board of Arbitration—"the trio of imbeciles."

The authorities in Washington City are confident that Germany will soon remove the embargo against hogs and hog products exported from the United States, and that France will not be long behind in removing trade restrictions. It is the exclusion of American meat products from France and Germany since 1881, that is the supposed cause of unfavorable balance of trade which appears annually in the statement of trade relations with those countries. In 1890 the amount and value of the exports of hog products from the United States to Germany were as follows: Bacon and hams, 2,224,640 pounds, valued at \$161,755; lard, 116,527,934 pounds, valued at \$7,815,484; pork, 1,198,746 pounds, valued at \$73,817; total, 119,891,320 pounds, valued at \$8,051,056. In nine years, as appears from a comparison, the yearly exports of bacon and hams from the United States to Germany have fallen off 39,325,130 pounds, and \$2,993,750; the annual exports are 316,900 pounds and \$34,401 less, while the yearly exports of lard, against which no prohibitory edict has been issued, have increased in quantity by 28,400,041 pounds and decreased in value by \$203,448.

Panama has no canal, no water and no money.

The New Jersey Central Railroad will have branch tracks to the iron works and zinc works in Jersey City.

The shortest time made through the Suez Canal is 14 hours and 15 minutes.

The secretary of the Sugar Company states on oath that the \$26,000,000 placed in their treasury by the constituent corporations were the legitimate profits of the sugar business.

The members of the British Government commission to inquire into the relations existing between capital and labor in that country have been appointed by the Queen, and include Mr. Hewlett, manager of the Wigan Coal and Iron Company; a representative of the Caledonian Railroad Company; also a dock manager and steamship owner, besides members of a trade council; one so-called "labor agitator," &c., but the complaint is heard that only six genuine labor representatives are found in the whole number, and so it is called "a cabinet of landlords."

The April returns to the Department of Agriculture make the condition of winter wheat 96.9, and of rye 95.4. The general average for condition is the highest reported for April since 1882, and the individual State averages are remarkable for their uniformity.

Reciprocity conference, at Washington City, October 12. It is supposed that the fishery business and the Behring Sea trouble will also have attention.

The New York Board of Trade and Transportation calls attention anew to the coast defenses, and wants the State Legislature to represent at Washington the urgent need of further protection against invaders.

Speaking of the expected exploits of the City of Paris when certain changes making in her machinery are complete, an English letter says Americans are in the lead in these attempts to reduce time in crossing the Atlantic. The writer says: "The City of Paris and the City of New York, the two largest, most rapid sailing and safest ships ever constructed, and the pioneers in this transatlantic fleet of big ships, are the result of American enterprise. The controlling interest in the Inman Line is held in Philadelphia, and it was Quaker City capital and enterprise that opened the way for this rapid march of improvement in Transatlantic travel." English builders, it is stated, are fearful that the contracts for the two proposed steamers for the Inman line will go to America.

The agent of an American firm stationed at Baku, Russia, telegraphs that the reported great Russian gusher is now doing not more than 10,000 barrels a day, and should have no effect in this country.

Mexican resources, whether in agriculture or minerals, cannot imperil the material prosperity of the United States, as a result of free competition. An American correspondent in that country says: "With a deficient water supply, an unprogressive agrarian system and a torpid and hopeless working population, Mexico is not a country from which competition is to be feared in any field of industry by the American people. Reciprocity can safely be made as free and generous as the Mexican Government is prepared to accept on the basis of equitable exchange."

San Domingo wants reciprocity, but her entire foreign trade is less than \$2,000,000 per annum.

The London *Times*, in a critical editorial upon the American Navy, indulges only in faint praise. The latest productions include several good ships, but the best of them, it is claimed, are from British models, and none so fast that they could not be overtaken.

It sometimes pays to make a show. Barnum left \$5,000,000.

The recent absorption of the Rome and Watertown Railroad by the New York Central may be regarded as another step in the consolidation of railroad systems, by which small lines gradually disappear.

A bill introduced into the New York Assembly prohibits any persons other than citizens of the United States from being employed in the public service in this State—that is to say, from sweeping the streets. Italy will protest.

A firm of shoemakers in San Francisco last week introduced a lasting machine, and all hands went out on strike. The Shoemakers' Association thereupon declared a lockout and 1000 hands are idle.

Alaska seals are not becoming extinct. Frank B. Gregory of Victoria, British Columbia, who represents the British Government in the Behring Sea controversy at Washington, quotes practical sealers as

authority for the statement that the animals are as numerous as ever. Capt. David Wallace of the steamer City of Topeka, a most reliable man, has stated that on his northward voyage last January he found the seals more plentiful off Cape Flattery than ever before. They were then traveling toward their breeding grounds in Behring Sea. The report has been circulated by interested parties that the catch on the Pribilof Islands has dwindled from 100,000 per annum to 21,000, but this is well known on the coast to be a misstatement.

The Illinois Senate passed a bill to establish a State Reformatory in which the trades shall be taught and other branches of education.

The formation of the Australian Commonwealth foreshadows in the not distant future, it is feared, trouble for both Germany and France in the Southern Pacific. The shortcomings of the mother country in that region which the colonies have keenly felt have been her acquiescence in the occupation of half the great island of New Guinea by Germany, and her acquiescence in the possession of New Caledonia as a penal station by France. Both these islands are in Australian waters and Australia owns one half of New Guinea. As the new commonwealth grows, notice to quit may be served on both France and Germany.

Iron workers and coal operators alike profess to be apathetic in regard to the predicted strike in the bituminous regions May 1. It is said that mine owners and manufacturers would, in many instances, gladly avail themselves of an excuse for shutting down for a month or two. The threatened strike will more directly affect the States of Pennsylvania and Ohio, and Pittsburgh will feel its depression to a considerable extent. Over 60,000 men are employed in these two districts.

Four striking stonecutters in Montpelier, Vt., were convicted of conspiracy to prevent a non-union man from working and will appeal to the Supreme Court.

Sanguinary accounts come from Chili, now in the throes of civil war. Trade is paralyzed and the resources of the country are being exhausted. Forced loans and confiscations are the order of the day. Eight ports are nominally closed, but there is no effective blockading force.

W. A. Fletcher & Co. are building two engines of the surface-condensing type for a steamer to be launched next Saturday from Burtis' yard in Brooklyn for the Knickerbocker Excursion Company. The steamer measures 230 feet keel and is expected to run 19 miles an hour.

The French Government have resolved to attach to their foreign embassies persons instructed to obtain information concerning commercial affairs in the country to which they are sent. They will be prepared to make any investigation desired or to answer any questions.

In some parts of this country Italians who contribute to the Mafia are promptly discharged from service.

Foreign steamship lines rebel against the new law which makes peremptory the return of emigrants rejected by the official inspectors, and litigation is probable.

Hot water is now automatically supplied in Paris by penny in-the-slot machines. Nine quarts are delivered for this sum, and the water is found useful by the poor and by cabmen for their footpans, or bouillottes. A coil of copper pipe inside the machine communicates with the street main, and is heated by gas burners; the penny allows the tap to be opened on pushing in a "button." A glass of hot wine is also sold by similar machines in Paris.

The Iron Age

New York, Thursday, April 16, 1891.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

A Better Outlook.

A good many circumstances have conspired to give publicity and prominence to the miserable condition of the iron trade and to allied industries. While the struggle for work has been terrific and prices have reached a level unremunerative to the majority of manufacturers, there have been some obvious reasons why producers have gone out of their way to represent their condition as deplorable. It has suited many of them to darken the shadows, because it would give them advantages in the purchase of their year's supply of raw material. The Lake ore producers are in a position where they can be made to yield to pressure, which has been quite energetically applied. We are inclined to believe that the future will brighten very suddenly, in the opinion of Western steel makers, as soon as this season's supply of ore has been secured. The manufacturers of the two valleys are engaged in a struggle for life with the coke makers and the railroads. Hence some of them are not adverse to make as much as they can of the terrors of Southern competition, much to the delight of Southern editors. In many places an adjustment of wages is going on, in which the wretched condition of the trade is an effective argument.

The reports of *The Iron Age* have faithfully portrayed the condition of the business. The decline in prices has been very rapid, and the volume of transactions has been relatively small. But it seems to us that in some sections of the country leading producers have made it a point, from motives of their own, to exaggerate the gravity of the situation. It is bad enough, in fact, but the outlook does not to us appear quite so hopeless as those would make us believe who have an end to gain.

The first signs of returning confidence are beginning to appear. The blows which our business interests received in November, resisted so well, have spent their force. Considering the enormous strain applied suddenly by extraneous forces, the business community has shown great innate strength. The consumption of iron, which was proceeding at an unparalleled rate, suffered a tremendous restriction. The magnitude and suddenness of this change proves that it could only be temporary, and that a reaction must soon follow. That reaction has not yet come, but the signs point to its coming at an early date. The financial situation has greatly improved, and although we are still distant from the time when many projects held in abeyance since November will be again taken up,

the current natural demand must soon assert itself. The condition of the roads throughout the country has been against the distribution of goods. Stocks on all hands have been run down to a minimum. The demand has been far below the normal volume, so that its return to that condition is likely to be a rapid and an effective movement.

But after all the most significant factor which promises a more active trade at an early date, accompanied by some recovery of price, is the very favorable condition of the crops in this country, and the reports of a poor agricultural outlook abroad, giving us the prospect of very large returns. Last spring we had, from all quarters, most dismal reports of the condition in which the winter wheat had come into the spring, and all the poor promise for the year was, unfortunately, fully verified. Now we have the Government crop report for April 1, showing the following conditions: Kansas, 99 against 87 last year; Missouri, 96 against 83; Illinois and Indiana, 97 against 75; Ohio, 98 against 87; Michigan, 93 against 67; California, 99 against 71. General average for all the States, 96 against 81. It must be considered also that the acreage is much greater this year, and that prices rule higher. That these prices must rule for the next season's crops at least, is made certain by the fact that the foreign crop of winter wheat is everywhere, except in Austro-Hungary, reported to be short. In France the yield will be from 25 to 30 per cent. short, and Russia will assuredly make no better showing.

A year of great prosperity to our farmers would naturally quicken the demand for iron and steel greatly. It will, of course, touch first those departments which look to the farmer as the chief consumer. It will have its influence in the railroads only at a later date, so that those lines of industry which are dependent upon them seem destined to a more prolonged season of dullness.

The Western Coal Strike.

Western business men are considerably exercised over the prospect of a general strike by the coal miners on May 1. The coal output of Illinois, Indiana, Ohio, Western Pennsylvania, and perhaps Iowa, and other States, will be completely cut off if no compromise is effected between the operators and the men. This will paralyze not only manufacturing industries but many other kinds of business, and will seriously interfere with the operations of the railroads traversing those States. It will be simply impossible to obtain fuel enough from other sections of the country to supply more than an insignificant part of the demand. The miners demand an eight-hour day, which the operators are not willing to concede. It has been asserted that several important railroad corporations are backing the operators in their refusal to grant shorter hours. The sympathy of the public is usually with coal miners, partly because of the dangerous nature of their occupation and partly because they are

paid very low rates of wages; but it remains to be seen whether public sympathy will not soon shift sides if Western business should, as a result of this strike, be affected with general paralysis. It will be a stubborn fight when once precipitated, and many families will be brought face to face with destitution. About the only good that can come out of it will be the restriction of production of manufactured goods, which may hasten the return of prosperity.

Excluding Emigrants.

The Chinese exclusion act is followed by another turn of the screw, in the effort to demonstrate to the world that America is for Americans. And accordingly the new act of Congress restricting immigration is now being enforced. Taking lessons from past experience in dealing with the subject of immigration, it is readily seen that popular sentiment is liable to extremes, swayed by caprice or prejudice, for which no justification can be found in reason. At the same time it would be hasty to affirm that the new restriction laws were uncalled for, so greatly has the hospitality of this boasted land of freedom been abused in the past. Before forming an opinion it is well to observe the import of the law which took effect April 1. Besides prohibiting the admission into this country of all criminals and persons physically or mentally incompetent, the law applies to "any person whose ticket or passage has been paid for with the money of another, or who is assisted by others to come, unless it be affirmatively and satisfactorily shown on special inquiry that such person does not belong to one of the foregoing excluded classes, or to the class of contract laborers excluded by the act of February 26, 1885." Beyond this, Section 3 makes it unlawful "to assist or encourage immigration or importation of foreigners through advertisements printed and published in any foreign country," and provides that "any alien coming to this country in consequence of such an advertisement shall be treated as a violator of the law." And Section 4 further prohibits "steamship and transportation companies and owners of vessels, either directly or through agents, by written, printed or oral representation, from soliciting, inviting or encouraging the immigration of aliens, except by stating dates of sailing and terms and facilities of transportation."

It becomes clear, even on a cursory perusal of the specification here laid down, that the primary object in view is to supplement the "contract labor" law already in force, and to raise impediments in the way of those who, in any branch of industry, would seek employment in the United States. Availing himself of a plausible pretext (the need of an efficient system of inspection applicable to newly-arrived emigrants being too evident to call for a defense), the professional labor agitator has succeeded in covertly accomplishing his object, and skilled laborers are placed in the same category with paupers, idiots, felons and persons suffering with disease. By

pernicious legislation of this character the industries of the country are made to suffer. Manufacturers are embarrassed in procuring men. Public works are prosecuted under circumstances of unusual perplexity. It is extraordinary that the publishing of an advertisement in a foreign country calling for workmen is made a punishable offense. A new plate-glass concern in Pennsylvania at this moment wants 1500 men, but finds a barrier raised against the skilled Belgians and others who would gladly enter their employ. One consequence must be that emigration, to some extent, will find new channels through Canada and across the border, and steamship companies in the Canadian trade can use measures to obtain emigrants, free from restraint. Every skilled laborer is an acquisition to the country, however obtained, and efforts to corner the labor market involve too heavy a task to succeed, however severe the system of inspection that may be enforced.

It is against the immigration of hordes of the lowest class of foreigners, whom we cannot hope to teach a just appreciation of the duties as well as the privileges of American citizenship, that we need protection. Morally and intellectually low, these men are becoming a curse to the country, while the landing of every skilled mechanic is a blessing which we should be eager to secure.

Statistics of Overland Trade.

The misleading character of the statistics of trade with Mexico and Canada, as compiled by the bureau at Washington, forms a frequent subject of complaint, and the latest annual statements enforce the necessity of reform in this particular. According to the Washington Treasury statistics for 1889-90, the total value of American exports to Mexico for that year was \$12,666,108, whereas the statistics coming through the bureau at Washington maintained by the Mexican Republic, which were recently reproduced in these columns, show that the amount of imports from the United States in the year named was \$22,689,420, this country leading all others in Mexico's import trade. Here is a discrepancy of \$10,000,000—quite sufficient to form the basis for many false deductions and reasonably exciting suspicion of the worthlessness of the whole compilation. A correspondent at the Mexican capital affords the only rational explanation, the same that has been volunteered on previous occasions, that the figures derived from Washington only cover what was transported by sea. The writer asks: "Does any one imagine that the Central and National railways of this country received no freight from the American lines they are in connection with on the border? I have made a rough estimate of the value of American goods coming here by rail in the fiscal year 1889-90, based on freight receipts on those goods, and it is not less than \$10,000,000. Add this amount to the value of the goods coming in by sea and you have over \$22,000,000,

almost \$23,000,000, and this is very nearly correct. Mexico, instead of being the tenth country in point of rank as to receiving exports from the United States, should be placed in the seventh rank, just under Belgium. Mexico takes twice as much of American manufactures and products as does Brazil." Thus corrected, due allowance being made for merchandise crossing the international boundary by rail, it appears that of Mexico's aggregate imports in 1890, amounting to \$40,000,000, the United States furnished more than one-half. It will be observed with satisfaction that the chief of the Washington Bureau of Statistics, S. G. Brock, urges Congress to amend the law relating to customs statistics, that means may be taken to secure accurate information respecting the overland trade to Mexico, and Canada as well. The grievance is of long standing.

The Tin-Plate Question.

A very promising incident in the progress of the new tin-plate industry is the announcement made in our columns last week that an important establishment had resolved to abandon the erection of a contemplated galvanized sheet works and to devote whatever capital and energy might have been required in that direction to the manufacture of tin plate. We are informed that this step was not taken in a spirit of blind enthusiasm over an industrial idea, but that the question of cost and comparative profits was carefully and very thoroughly considered, and the weight of argument seemed clearly to be with tin plate rather than galvanized sheets. The manager of the works had previously built up a high reputation as the head of another concern for the quality of the galvanized sheets which he turned out, so that he is well fitted to understand the claims for profitable returns of the galvanized sheet business. Under existing circumstances, with the price of galvanized sheets lower perhaps than ever before known, and with the capacity for production steadily expanding, the outlook is regarded by him as vastly more cheerful in the direction of tin plate, in whose manufacture so few domestic works are now engaged.

It must be confessed by the most ardent friends of the new industry that the progress thus far made in the domestic manufacture of tin plate has been disappointing. Tin plate andterne plate are being made at several works, it is true, and preparations are going on looking to the erection of other plants, but there is a conservatism, a deliberation, about the whole proceeding which is decidedly at variance with the activity promised by the advocates of a tin plate industry. It had been supposed that a large number, if not a majority, of the sheet mills would add cold rolls and tinning stacks as soon as adequate tariff protection was assured. This has been done in very few cases, and so far as we can learn there are not many sheet manufacturers to be added to the

list of tin plate makers. The business appears to be remanded by quite general consent to those who will make a specialty of it. The sheet mills are evidently not inclined to make the tin plate manufacture an appendage of their business. This is not because they are very actively employed in turning out black sheets for the trade. Many of them are quite hungry for orders, and are naming such exceedingly low prices that they are apparently in need of fresh outlets for their product. If there is ever to be a time when the manufacture of tin plate will be taken up by the sheet men generally they could hardly find the conditions more favorable than they are at present. A tinning stack costs but little, and we have all along been assured that the manufacture of tin plates is a simple process.

The friends and advocates of a domestic tin plate industry could do no better thing at this time than to engage in missionary work in their own ranks, and induce owners of sheet mills to go into the tin plate business. The public expected this to be done, and the makers of sheet iron and steel are standing in their own light when they refuse to take up the new industry and thoroughly domesticate it. At the present rate of progress it is beyond the power of man to calculate when this country will be able to supply its own tin plate requirements. The erection of special works is a matter of exceeding indefiniteness. We may be wrong in our diagnosis of the situation, but it seems quite clear that the duty of establishing the tin plate industry as a potentiality really rests on the sheet manufacturers and not on the country at large. The few of them who have recognized their responsibility in the case and have gone to work to produce tin plates deserve credit, but their number should have been multiplied at least ten times before this. The fear of hostile legislation is hardly a valid excuse, as there would always be more or less danger of that. The present condition is what the trade and the public have to deal with, and present conditions are certainly favorable. Tin plate can now be made profitably in this country, and experienced galvanizers say with a better margin than galvanized sheets. The sheet mills are neglecting a golden opportunity if they let this summer pass without greatly increasing the output of American tin plates.

It is just to Randolph & Clowes, manufacturers of brass and seamless tubing at Waterbury, to whom we are indebted for a thorough description of the methods of manufacturing tubing, to state that the data for the article were placed at our disposal about sixteen months since. At that time the statements to which some objection has been made were correct. The allusion to a Waterbury firm was not made to the firm whose work in this direction was referred to in our issue last week.

Europeans are introducing the manufacture of cotton into Peru.

PERSONAL.

J. D. Long, formerly a broker in iron and steel, with office in the Hamilton Building, Pittsburgh, has accepted the position of treasurer and manager of the Keystone Mfg. and Supply Company, located at Thirty-third street and A. V. R. R., in that city. The concern manufactures copper and bronze tuyeres, coolers and bosh plates, and also deal in railroad and mill supplies.

F. G. Tallman, formerly of Beaver Falls, Pa., has opened an office in Room 512, Hamilton Building, Pittsburgh, Pa., as mechanical engineer and contractor. Mr. Tallman is making a specialty of the erection of wire rod mills, and has recently closed a contract with the United States Steel Company of Jackson, Ohio, for the erection of a rod mill of his own design, work on which will be commenced at an early date.

C. E. Irwin, for some years secretary of the La Belle Iron Works of Wheeling, W. Va., but who severed his connection with that concern some time ago, intends to locate in Helena, Mon., and will represent in that section several of the iron and steel concerns of Wheeling, W. Va.

W. C. McCausland, formerly cashier of the H. C. Frick Coke Company and the Union Supply Company, Limited, has been appointed cashier of Carnegie, Phipps & Co., Limited, at Pittsburgh.

Alexander Cunningham, of the great firm of Scotch iron and steel manufacturers, Merry & Cunningham, is now in New York.

OBITUARY.

JOHN H. BUCKINGHAM.

John H. Buckingham, secretary and general manager of the Chicago Steel Works, died suddenly at Lansing, Mich., on the 5th inst. He had been prominently identified with the iron trade of Chicago 16 years, and was considered an expert manager, capable and efficient in every respect. Mr. Buckingham was the son of the late Gen. C. P. Buckingham, and was born at Mount Vernon, Ohio, August 29, 1851. He would, therefore, have been 40 years old next August had he lived. He received a common school education at Mount Vernon, and leaving there when he was 14 years old, his parents took up their residence at Irvington-on-the-Hudson, N. Y. They resided there two years and came to Chicago in 1868. He went into business with his uncles, J. and E. Buckingham, who were engaged in running an elevator. In 1875 his father and uncle organized and started the Chicago Steel Works, and Mr. Buckingham, Jr., entered the firm and has remained there steadily since. At the time of his death he transacted the most of the important business of the firm. His death was undoubtedly caused by apoplexy, as he was subject to attacks of that disease. He leaves a wife and one child.

CHARLES E. ILSLEY.

Charles E. Ilsley, a promising young pig-iron merchant of Chicago, head of the firm of Ilsley, Goodrich & Co., was killed on April 7 by being thrown from a carriage by a runaway horse. He was but 35 years of age and unmarried. Mr. Ilsley was a son of Charles F. Ilsley, a prominent banker of Milwaukee and also interested in the Northwestern Iron Company. He was a member of the class of 1883 at Ann Arbor, Mich. In his business career he had developed decided talent, and would have made his mark if he had been permitted to live. Personally he was a man of most polished manners, and had a very wide circle of friends who were won by his estimable qualities.

CHARLES L. WAY.

Charles L. Way of Evanston, Ill., died last week at Biloxi, Miss., aged 73 years. He was for years superintendent of the North Chicago Rolling Mill, but had latterly been engaged as rail inspector of the Chicago and Northwestern and the Pittsburgh, Fort Wayne and Chicago railway systems. He leaves a widow and one daughter.

GEORGE SMALL.

George Small, one of the wealthiest men in Maryland and the senior member of the firm of George Small & Co., died on Saturday at Baltimore. He was born in York, Pa., December 13, 1825, and at the age of 21 went to Baltimore. He supplied the Brazil market for many years with 90,000 barrels of flour annually. He aided in the opening of the Northern Central Railroad and had been for many years one of its directors. He was also a director in the Baltimore and Potomac Railroad, in the First National Bank of Baltimore and president of the Ashland Iron Company, whose works on the Northern Central are the largest manufactory of the kind in Maryland.

The Charcoal Furnaces.

Since our last issue we have received the reports of the majority of the charcoal furnaces, whose capacity has also suffered a notable reduction during the month of March. The details for the different States and territories are submitted below.

Charcoal Furnaces, April 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	7	580	7	650
New York.....	8	1	107	7	603
Pennsylvania.....	18	2	184	14	736
Maryland.....	6	1	115	5	515
Virginia.....	18	1	49	17	845
Ohio.....	10	3	236	7	450
Kentucky.....	1	0	0	1	95
Tennessee.....	6	2	637	4	515
Georgia.....	4	0	0	4	610
Alabama.....	13	4	655	9	1,960
Michigan.....	27	12	3,826	15	4,075
Missouri.....	2	1	293	1	517
Wisconsin.....	5	4	1,908	1	210
Texas.....	4	2	490	2	460
California.....	1	0	0	1	120
Washington.....	1	0	0	1	170
Oregon.....	1	1	220	0	0
Totals.....	137	41	8,995	96	12,421

As compared with previous months the record stands as follows:

	Furnaces in blast.	Capacity per week.
April 1.....	41	8,995
March 1.....	51	10,890
February 1.....	56	11,365
January 1, 1891.....	50	12,280
December 1.....	67	12,738
November 1.....	70	13,282
October 1.....	66	13,389
September 1.....	63	12,904
August 1.....	59	10,745
July 1.....	61	12,511
June 1.....	61	12,312
May 1.....	52	10,698
April 1.....	52	10,804
March 1.....	59	12,606
February 1.....	58	11,378
January 1, 1890.....	50	11,485
December 1.....	66	12,779
November 1.....	67	12,293
October 1.....	63	12,047
September 1.....	60	11,227

The following furnaces have blown out or banked during March: Kent, in Connecticut; Mont Alto, in Pennsylvania; Maryland and Muirkirk, in Maryland; White Rock, in Virginia; Jefferson, Mount Vernon and Pine Grove, in Ohio; Union and Manistique, in Michigan; Midland, in Missouri, and La Grange, in Tennessee. Lone Star, in Texas, blew in on the 18th, and Tassie Belle is getting ready. Wyebrooke, in Pennsylvania, started on the 21st ult. Bellefonte, in

Kentucky, blew in a few days since, and Aetna, in Tennessee, was active during the greater part of March.

We are now in a position to report the aggregate capacity of all the furnaces in the United States on the first of the month, but must note that one important error crept into our report on the coke furnaces last week. Girard Furnace, in the Mahoning Valley, was at work, making the capacity of the valley 3373 tons. Vigo Furnace, in Indiana, blew in on the 19th ult., so that the corrected capacity of the coke furnaces is 67,570 tons, in the place of 66,300 tons.

The weekly product of all the furnaces on February 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
April 1.....	228	113,163
March 1.....	237	154,326
February 1.....	294	146,050
January 1, 1891.....	302	167,599
December 1, 1890.....	340	183,846
November 1.....	342	177,938
October 1.....	336	179,253
September 1.....	323	171,776
August 1.....	324	164,738
July 1.....	306	175,727
June 1.....	345	180,791
May 1.....	344	180,099
April 1.....	344	178,474
March 1.....	343	180,901
February 1.....	334	173,651
January 1.....	353	174,068
December 1, 1890.....	328	169,151
November 1.....	323	165,225
October 1.....	311	151,057
September 1.....	294	134,068
August 1.....	286	145,899
July 1.....	285	141,419

The March decline in the product of the furnaces, therefore, aggregated 21,000 tons a week. Since December 1 the restriction has been 70,000 gross tons per week.

The indications, however, point to an early recovery, and May 1 will probably witness quite an increase.

The Illinois Steel Company have already started some of their furnaces, and as soon as the coke strike is over other plants will again become regular producers.

The charcoal producers are carrying practically the same quantity of stock as formerly, 29 active and 23 idle furnaces, whose combined capacity is 11,016 tons per week, carrying 149,730 tons. Over one-third of this, or 57,362 tons, is held by ten active and two idle Michigan furnaces, while the bulk of the remainder is held by Southern and Western producers, Wisconsin alone reporting 24,273 tons, an average of 6068 tons each for the four active charcoal producers in that State. More complete returns since our report of last week alter slightly our stock report for March, eight additional anthracite furnaces reporting a stock of 16,066 tons, while 56,832 tons are reported by 21 additional coke furnaces. The complete returns from all furnaces now show that 123 coke furnaces, 61 of which were idle on the 1st inst., whose combined capacity is 83,024 tons per week, are carrying stock to the amount of 258,222 tons, and 52 active and 13 idle anthracite furnaces, having a weekly capacity of 23,016 tons, hold 130,198 tons.

Last week the bids for the new iron bridge over the Erie Canal at Church street, Schenectady, N. Y., were opened. The contract for the superstructure was let to the Hilton Bridge Company of Albany, N. Y., for \$7975.

Two thousand tons of Lady Ensley foundry pig iron of Sheffield, Ala., was shipped on April 7 by barge to St. Louis, via Tennessee Navigation Company's line. Although this was for June delivery, it was more convenient to ship now, the state of the water making it more easily loaded. Several hundred tons more are to be routed the same way in a few days to cover sales. A steamer with three barges in tow, loaded with barreled mineral

paint, &c., passed through the New Shoals Canal and the draw bridge at Florence, Ala., on April 9, *en route* from Chattanooga, Tenn., to St. Louis. Six thousand sacks of grain, feed, &c., arrived at Sheffield, Ala., a few days since via the Tennessee River, *en route* from St. Louis to Atlanta, Ga., taking rail from Sheffield—a reduction of nearly 50 per cent. on freight being claimed on the water and rail shipment against all rail. These shipments show that the Tennessee River can be navigated, and that the efforts of Government work on the shoals are being effective.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., April 14, 1891.

The Italian agitation having resolved itself into a cartoon war which seems to irritate the King and Prime Minister beyond peaceful endurance, is not expected to eventuate in anything more serious than newspaper tirades in court journals and political organs in the mellifluous vernacular of the sunny peninsula. Our Navy Department, however, has been pushing work on the war vessels under contract, and in anticipation of the possibilities of war, are profiting by the existing object lesson of the sudden incidents in affairs which may bring about immediate requirements for a powerful naval force.

The department is at work on the preliminaries of new designs and theoretical working out of new problems in naval architecture, armor, armaments and engines. There has been much wordy talk about the so-called defenselessness of the United States from a naval point of view, and in this talk the observations of persons ignorant of the exact status in this respect have been given an appearance of accuracy by the similar talk of a few naval authorities in the department. The bad taste, not to speak of apparent lack of patriotism and unwarranted misrepresentation, was a topic of remark, as the effect was to stimulate Italy into impatience, supposing the statements were true, and naturally embarrassed and tightened diplomatic negotiations. The Department authorities and experts are watching with instinctive pride the interest which European authorities are taking in American naval affairs. As an offset to the belittling talk of some of our own naval men, who should know better, attention is called by the Department to the paper on "American War Ships," read before the British Institute of Naval Architects, which is very complimentary in its estimate of the strength of our new navy.

The remarks of Director of Naval Construction White are also flattering in some respects. He thought that our constructors had obtained economy in size and cost at the sacrifice of some qualities in design. The officers here dispute Mr. White's acquiescence in the opinions of members of the meeting that our ships would not realize the speed in actual warfare that they displayed on their trial course. Mr. White took as his base of comparison the American Pirate, now building, with the British Blake. The latter is put down at 22 knots, the speed of our own commerce destroyer. The Britisher claimed that the Blake would beat the Pirate. It was also claimed that the Pirate could not catch the ocean greyhound Teutonic.

So high an authority as Sir John Hay admitted that the Americans are building faster and individually better ships than the English. Naturally, the Britishers of the Naval Institute were loth to concede anything flattering to the ships of the new American navy; but, in spite of all, they ran into searching inquiry, comment and

analysis, which, in most cases, was complimentary, notwithstanding their unwillingness to concede the progress we have made.

Trade with the Argentines.

American trade with the Argentine Republic, which at present comes through British and German steamers, is shown by recent consular reports to have been considerable for 1890, and with reciprocity in operation would rise to millions more. The following shows the value, as far as obtainable, through the Argentine Custom House:

	Quantity.	Official value.
Wire, fencing, kg.....	44,472	\$2,190
Wire, other kinds, kg.....	3,400	476
Nails, kg.....	35,254	6,785
Iron safes, kg.....	6,339	1,397
Stoves and piping, kg.....	165,898	16,590
Cutlery.....		2,076
Iron, ornamental articles.....		9,150
Iron, unmanufactured, kg. 6,156,495		224,734
Tools, implements, artisan and domestic.....		148,262
Iron furniture.....		25,730
Iron, joist and columns, kg. 141,180		5,647
Plows, number.....	32,336	237,717
Husking Machines, number.....	1,024	8,227
Mowers, kg.....	10,954	5,460
Rakes kg.....	8,654	2,850
Plowshares, kg.....	64,863	18,548
Planters, number.....	8	234
Reapers, number.....	3,566	50,433
Thrashing machines, number.....	7	4,480
Spades, shovels, picks, kg.. 384,096		83,158
Other agricultural implements.....		81,873
Other machinery and engines.....		1,220,402
Other manufactures of iron.....		880,868
Iron hoops.....		28,242

In the tariff of the country iron and steel, not galvanized, in sheets, ingots or bars, is 10 per cent. There is also a long free list, including machinery, &c.

This will afford some idea of what American trade might be made with reciprocity and direct lines of steamers.

The affairs of the Columbia Iron and Steel Company of Pittsburgh, mention of whose assignment was made in our issue of last week, are still in a very unsettled condition. It seems that a few days before the firm made an assignment the Belmont Nail Company of Wheeling, W. Va., one of the largest creditors of the concern, made application in the courts of Pittsburgh to have a receiver appointed. While this move was still pending the firm made an assignment. The efforts of the Belmont Nail Company, however, to have a receiver appointed have been successful and the court has named Col. J. M. Schoonmaker, well known through his former connection with the J. M. Schoonmaker Coke Company. The firm of Boggs & Buhl of Allegheny City, Pa., who are the largest creditors of the Columbia Iron and Steel Company, hold \$102,000 worth of first mortgage bonds, and it is announced that a fund has been raised by E. M. Butz to purchase these bonds. It is not improbable that a complete reorganization of the affairs of the Columbia Iron and Steel Company will take place and many changes be made in the officers. Robert Hogsett is named as the coming president of the company, and the balance of the officials will probably be from Uniontown, Pa., where the works of the firm are located. In case sufficient money is raised to pay the pressing indebtedness of the firm, a determined effort will be made to secure an extension of five years on the balance of the indebtedness. In case this is successful the receiver will be withdrawn, and the Columbia Iron and Steel Company will be placed on their feet again.

Preparations are being made in St. Louis for the meeting of the American Boiler Makers' Association, to be held on the second Tuesday in May.

MANUFACTURING.

Iron and Steel.

At Pittsburgh this week a decree was granted by the courts for the dissolution of the Steubenville Iron and Steel Company of Steubenville, Ohio. Their plant was formerly known as the Alikanna Rolling Mill, and has been operated for some time by the Cartwright Iron and Steel Company. The product was muck bar and skelp iron.

On the 17th inst. an application will be made to the Governor of Pennsylvania for a charter for the Schultz Bridge and Iron Company of Pittsburgh, the character and object of which is the manufacture of iron or steel or both, or any other metal or article of commerce from metal or both, including the manufacture and construction of bridges, roofs and structural work of all kinds from iron or steel or both metals. The incorporators are Henry W. Oliver of the Oliver Iron and Steel Company of Pittsburgh, Albert L. Schultz, William R. Thompson, Philip W. Herzog, Thomas S. Bigelow and others, all of Pittsburgh. This concern will succeed to the business of the Iron City Bridge Works, Charles J. Schultz proprietor, which made an assignment some months ago. Since that time their plant has been conducted by the Oliver Iron and Steel Company, which concern was one of their heaviest creditors.

The Lady Ensley Furnace, at Sheffield, Ala., which has been idle and relined during the past few months, will again resume operations by the last of April. It is owned by the same company operating the old Sheffield Company's furnace, purchased a year ago by Col. Enoch Ensley of Memphis, Tenn., and named Hattie Ensley, and which has beaten all furnace records on output, being of 125 tons per day capacity, but has turned out as high as 203 tons per day, and averaged about 160 tons, of high grade.

The establishment of George Rollings & Co., Limited, proprietors of the Pittsburgh Malleable Iron Works, at Pittsburgh, was completely destroyed by fire on the morning of April 13. It is not known as yet whether the works will be rebuilt.

The Aetna Iron and Steel Company of Bridgeport, Ohio, have decided to move their 16-inch mill into a new building now being erected for that purpose. It will be driven by a 36 x 48 inch Porter-Hamilton engine, which is being built for them by William Tod & Co. of Youngstown, Ohio. There will also be attached to this engine a 24-inch billet mill, which is being built for the Aetna Iron and Steel Company by the Lloyd Booth Company of Youngstown, Ohio.

Wharton Furnace, at Port Oram, N. J., has been blown in.

The Seyfert Rolling Mill, at Reading, Pa., shut down on April 7 because of the refusal of the employees to accept a reduction in wages.

No. 2 Isabella Furnace, at Etna, Pa., has been blown out after being in continuous blast since May, 1886. In that time the furnace cast 366,000 tons of iron. No. 1 furnace is idle, but has been relined and is now being prepared to go into blast at an early date. These furnaces are 75 feet high and have a 20-foot bosh.

The Bellefonte Furnace, at Bellefonte, Pa., will be lighted some time this month, the repairs to the furnace being about completed.

It is stated that subscriptions to the amount of \$50,000 have been made by Pineville, Ky., parties with a view to inducing a Pittsburgh firm to remove its 70-ton furnace to the former place.

The new plant of the Boston Iron and Steel Company in course of erection at McKeesport, Pa., is rapidly nearing completion. The furnaces are about completed, and part of the machinery is on the ground.

The United States Iron and Steel Plate Works, at Demmler, Pa., are running to their full capacity, and the company are arranging for several additions to be made at the plant this summer.

The Bates Steel and Iron Company, capitalized at \$100,000, have been incorporated at Columbus, Ohio.

The St. Louis Steel Works, at St. Louis, Mo., recently destroyed by fire, will be rebuilt.

The nail plant of the Laughlin Nail Company, at Martin's Ferry, Ohio, containing 222 nail machines, is being operated to its full capacity. This concern has the distinction of possessing the largest cut-nail factory in the world.

There is now every indication that the Center Iron Furnace at Bellefonte, Pa., which has been idle for a few months, will resume operations. The Valentine Furnace Company have leased the plant, and have succeeded in getting their bonds purchased, which they issued some time ago, to the amount of \$75,000. At least

half of that amount has been subscribed by Bellefonte parties. Extensive repairs have been made at the College Furnace, and the prospects are that work will begin there again.

A cargo of fire brick from England for the Kirkland blast furnace, to be erected at Kirkland, Wash., by the Great Western Steel and Iron Company, has arrived at Seattle, Wash.

During the temporary banking of the Haselton Furnace, the Andrews Brothers Company, Youngstown, Ohio, are putting in a battery of six steel boilers.

The stockholders of the Tennessee Coal, Iron and Railway Company have elected the following Board of Directors: J. H. Inman, T. C. Platt, C. C. Baldwin, W. C. Sheldon, James Stillman, F. T. Brown, James T. Woodward, Samuel Thomas and A. B. Boardman of New York; Thomas Barrell, Napoleon Hill and Enoch Ensley of Memphis; T. T. Hillman of Birmingham, and N. Baxter, Jr., and A. M. Shook of Nashville.

The New Haven Rolling Mill is closed down, owing to a strike of the wire drawers.

At Pittsburgh last week two deeds to the Oil Well Supply Company, Limited, of that city, were filed for record. One was from the Continental Tube Works and the other from the Elba Iron Works. The consideration named in the deeds is \$375,000. This completes the deal by which the Oil Well Supply Company, Limited, acquire possession of the above plants. It is said the new owners will erect 35 more puddling furnaces, build a plate mill and make other improvements.

Park, Bro. & Co., Limited, proprietors of the Black Diamond Steel Works, at Pittsburgh, are making some extensive improvements and alterations in their plant for the purpose of introducing fuel gas.

The Pittsburgh Steel Casting Company of Pittsburgh are at work on the steel castings for the 44-inch cogging mill to be erected at the Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead, Pa., the contract for which was awarded to the Robinson-Rea Mfg. Company of Pittsburgh. The Pittsburgh Steel Casting Company are making the castings of their patent Bessemer steel, some of which will require 23,000 pounds of steel to cast.

Negotiations leading to the lease of the plant of the Trinidad Rolling Mills and Iron Company, at Trinidad, Col., have been completed, and the plant has been leased to Ralph J. Wick of Youngstown, Ohio, for one year, with the privilege of purchasing it at the end of the year for \$26,900. It is understood that Mr. Wick, who is now in Trinidad, will improve the plant to the extent of \$6000 or \$8000 and that the mill will be in operation in a short time. It was built in 1888-89, and is said to have originally cost \$65,000.

The Benwood Iron Works of Wheeling, W. Va., have decided to put their blast furnace, located at Martin's Ferry, Ohio, in operation as soon as possible. A sufficient stock of coke is on hand to run the furnace for some time, and it is expected that when this is exhausted the coke strike will be settled, and no delay will be met in securing coke. The furnace has been out of blast for about three months.

The Ellis & Lessig Steel and Iron Company, Limited, of Pottstown, Pa., announce that they have favorably considered an offer of \$100,000 and 40 acres of land, made by the citizens of Salem, Va., if they would remove their plant there. The concern employ 700 men in their nail factory, plate and puddle mills, and as soon as the present stock is worked up they will remove their machinery to Salem. The necessary papers were signed last month.

The new rolling mill for the Washburn & Moen Mfg. Company, at Waukegan, Ill., will be quite extensive. The main building will be 140 feet in width by 400 feet in length, with a wing on one side 40 feet in width and 160 feet long and one on the opposite side 440 feet in width by 100 feet long. The building will be entirely of steel, designed and built by the Berlin Iron Bridge Company of East Berlin, Conn.

Machinery.

The John F. Byers Machine Company, recently organized at Ravenna, Ohio, have just finished the construction of their first building, which is a brick machine shop, 28 x 100 feet. They have also nearly completed another building, 30 x 75 feet, to be devoted to the painting and setting up of their hoisting engines. It is the intention of the firm to add a large office and storage building early in the coming summer.

A reorganization of the Virginia Steel Car Company has taken place. Col. Robert Catlett was elected president, instead of A. S. Buford, resigned. Mr. Foster was elected vice-president and Joseph A. Moore secretary and treasurer; and the directors are: Gen. Fitz Hugh Lee, Wm. A. Anderson, W. W. Green of Chicago and the officers of the company.

The Standard Boiler and Bridge Works of Bellaire, Ohio, have been granted a charter for the purpose of doing a general boiler and bridge manufacturing business. The new concern have elected the following officers: Edward Jones, president; O. T. Blackburn, vice-president; Samuel Simmons, secretary, and J. E. Jarold, general superintendent of the mechanical department. The material for their iron buildings has been ordered and Mr. Jarold is now engaged in buying the necessary machinery. The plant of the new concern will be located near the Bellaire Nail Works.

The Elison Machine Works of Montgomery County have been incorporated at Richmond, Va.

The Lone Star Iron Company of Jefferson, Texas, wish to amend their charter, increase their capital stock and provide for the issuance of bonds for the erection of a steel plant. A special meeting will be held at their office in Chicago, Ill., on May 4.

A furnace is being built at Harriman, Tenn., by the Harriman Wrought Iron Company. This company were recently incorporated and organized in New Jersey, with a capital stock of \$200,000. The president of the corporation is E. K. Sequine of Jersey City. Main office, 76 Montgomery street, Jersey City, N. J.

Work is progressing on the remodeling of the King John iron furnace, belonging to the De Bardeleben Coal and Iron Company of Bessemer, Ala.

J. D. Kase of Danville, Pa., has been elected manager of the North Carolina Steel and Iron Company, at Greensboro, N. C. Mr. Kase has received instructions to construct the 100-ton furnace which has been talked of for some time.

It is stated that a rolling mill is to be erected in Baltimore, Md., by C. D. Beckwith of Paterson, N. J.

Work will soon be commenced on the rolling mill at Salem, Va., which has been moved to that place from Newport, Ky. The new organization will be known as the Salem Rolling Mills Company. The capital stock is \$100,000.

The contract for the masonry and foundation of the Buena Vista Steel Company, Buena Vista, Va., has been let to the Mundy Bros.; the Buena Vista Company have received the contract for the lumber, and a part of the iron work will be supplied by the A. K. Rarig Company.

The Pond Machine Tool Works of Plainfield, N. J., have just shipped one of the 12-inch gun lathes they are building for the Government. This lathe was fully described and illustrated in *The Iron Age* of October 30, 1890. It will form part of the gun factory plant at the Watervliet Arsenal.

It is reported that a Pittsburgh, Pa., company have made a proposition to P. Maguair and G. S. Moore for the removal of a 70-ton iron furnace to West Pineville, Ky.

Plans are being prepared for an iron furnace by the Farmville Coal and Iron Company of Farmville, Va.

Joseph B. Reed, Cairo, Ill., manufacturer of iron-working machinery for railroad and general machine-shop use, has recently erected an addition to his plant, consisting of a three-story brick shop 50 x 125 feet.

The Laughlin Mfg. Company of Louisville, Ky., have closed a contract with the Harvey Land Association of Harvey, Ill., a suburb of Chicago, for 485 x 200 feet of property fronting south on 151st street, to be utilized as a factory site. The Laughlin Mfg. Company, of which S. E. Bliss is manager, will employ about 150 men at their works in the manufacture of shafting and pulleys.

The Hartford Engine and Machine Company of Hartford, Conn., were burnt out on the 8th inst.

The Toledo Machine and Tool Company of Toledo, Ohio, have purchased the elevator business of Smith & Haldeman of that city, and will carry on business in the above lines at the establishment just acquired.

The Rhode Island Locomotive Works have just delivered to the New York, New Haven and Hartford Railroad five American type engines with 18½ x 24 inch cylinders and 65½-inch wheels. Two mogul locomotives with 19 x 24 inch cylinders have been shipped to the Fort Worth and Rio Grande Road. The works have orders on hand for about 21 locomotives. These include four 19 x 26 moguls for the Maine Central, three 18 x 24 six-wheeled switch engines for the Old Colony, two 18 x 24 moguls and three 17 x 24 for the Milwaukee, Lake Shore and Western, six 17 x 24 for the Wabash, and three 19 x 24 for the Mexican Central. All these locomotives, except the moguls, are six-wheel switching engines.

One of the largest castings ever made in Worcester, Mass., was poured at the Star

Foundry recently. It was a fly wheel, weighing over 20 tons, and was 2½ feet in diameter, with a 42-inch face. It will be finished in Fitchburg, there being no lathe large enough in Worcester.

Arrangements have been perfected at the Douglas branch of the American Axe and Tool Company to use crude oil instead of coal and coke in the forging department. A large tank, holding 7000 gallons, has been put in at the station on the New York and New England Railroad and another one at the axe works.

The Connecticut Motor Company have decided to remain at Southington for the present. At the election of officers R. E. Dunston was chosen president and Sherman Blakeslee treasurer.

The Boston Car Spring Company, recently petitioned into insolvency, owes about \$115,778, including notes indorsed by T. C. Lathrop, treasurer of the company, who is also insolvent. The assets are a factory on Terrace street, mortgaged for \$15,000; machinery and tools, mortgaged for \$6000; accounts, cash and miscellaneous, amounting to \$11,150.

It is intended to utilize the old Mason machine works and boiler shop, at Taunton, Mass., for the manufacture of the new American carding machine. Necessary machinery is to be put in at once, and in the near future it is expected that an extension of the works will be made.

Royal M. Bassett, for many years head of the Birmingham Iron Foundry Company, Birmingham, Conn., has retired from the presidency and severed his connection with the firm.

The foundry of W. L. Sharp & Son, at Steubenville, Ohio, has been burned, at a loss of \$25,000.

Youngstown, Ohio, is to have a sheet-iron lath company, with a capital of \$400,000.

The machine shops and foundry of Remillard & Co., at Three Rivers, Quebec, have been destroyed by fire; loss, \$8000.

J. Alston, according to report, contemplates the immediate erection of machine shops at Greenwood, S. C. The cost of the shops is to be \$11,000.

Iron works and machine shops are to be erected at Florence, S. C., by the recently incorporated Florence Iron Works.

The Lowmes Mfg. Company, with a capital stock of \$300,000, have been recently organized at Orlando, Fla. The new company will operate iron foundry and machine shops, and will manufacture the Lowmes Pipe Wrench.

Machine shops are to be erected at Laverne, Ala. The stock is being rapidly negotiated by Buchanan, Sanders & Co.

The Russellville Foundry and Machine Company have been organized at Russellville, Ark., by Luker & Smith. The new company contemplates the erection of an iron foundry and machine shop.

C. H. Calfee declares the report premature relative to the organization of the new company to establish machine shops and plow works at Wytheville, Va. He adds, however, that such a company will probably be organized in the near future.

It is stated that a stock company is to be incorporated to purchase the iron foundry of Kelly Brothers at Jonesboro, N. C., and to enlarge and operate the same.

N. G. White and others are organizing a stock company for the purpose of establishing a foundry and machine shops at West Point, Miss. Operations upon the work will begin at once.

Work has commenced on the foundry of the new brass works at Buchanan, Va.

Hardware.

The National Screw and Tack Company of Cleveland, Ohio, report a thriving business, their screw plant running 22 hours per day and their tack machines 12 hours. They are turning out a full line of screws, and contemplate building an addition to their works.

The F. H. Foster Mfg. Company, makers of builders' hardware, Florence, Ala., advise us that they expect in the near future to enter upon the manufacture of a new line of locks. Having in connection with Chas. E. Jones and W. J. Flanagan patented a powder-proof and burglar-proof lock for safe deposit and bank work, they will apply the principle to all kinds of locks. They are also about to obtain the patent on another new lock which it is thought will meet with a favorable reception from the trade.

The Richmond Hardware Mfg. Company have been incorporated at Richmond, Va., with a capital stock of \$250,000.

A charter has been granted to the Standard Mfg. Company to manufacture bicycles and do a general manufacturing business at Martinsburg, W. Va. The new concern have a capi-

tal stock of \$50,000, with the privilege of increasing it to \$50,000. The incorporators are: Peyton R. Harrison of Rockford, Ill.; R. G. Surbridge of Chicago, and J. W. McCherry, M. A. Snodgrass and Charles D. Mattheis, Martinsburg. Mr. Surbridge is the patentee of the bicycle to be manufactured.

Joseph Lay & Co., Ridgeville, Ind., will erect a branch manufactory at once at Chattanooga, Tenn., for the production of steel wire brushes, brooms, &c. The new works will have an equal capacity to that now in operation at Ridgeville, Ind., which latter is being run to its utmost to keep up with their orders.

The Columbia Horse Nail Company, Chicago, Ill., have been incorporated, to manufacture and deal in horse nails and hardware supplies. The capital stock is \$45,000, and the incorporators are Frank A. Baxter, Charles J. Radcliffe, Lyman H. Easton and James L. McEvoy.

Miscellaneous.

Large car shops for the New Jersey Central Railroad will be built on the meadows near Elizabethport, giving work to 1000 mechanics.

The Lehigh Zinc and Iron Company of South Bethlehem have purchased a tract of land on the Lehigh River, near Shimmersville, and will put up a zinc oxide works. Operations will begin at once, and it is expected the works will be in blast next winter.

The National Brass and Iron Works will begin extensive operations in North Reading, Pa., about July 1.

The wire mill at the Taunton Copper Company's works, at Weir Village, Mass., is about completed, and all the rolling machinery for the mill has arrived. The addition is 70 x 80 feet, and is built on to the building formerly used as the yellow metal mill, making the entire length of the structure 100 feet.

The Osborne & Cheeseman Company, manufacturers of brass at Birmingham, Conn., have gone into the hands of a receiver. Their assets are nominally \$75,000, and their liabilities \$35,000.

The South St. Louis Stamping Company will erect new works at St. Louis, Mo.

The Union Iron Works will erect extensive shops at Erie, Pa.

The Hicksville (Ohio) Cart and Machine Company have made an assignment. The company will settle in full and resume operations.

The Tubular Car Company, a concern having a paid-up capital of \$5,000,000, have purchased a tract of 6000 acres near Bradford, Pa., where they will erect works employing 5000 men, and lay out a new town to be known as Charmony. The main building to be erected will be E-shaped, having three fronts of 644 feet and two of 755 x 68 feet, five stories high and built of stone to the third story, the remainder being brick and galvanized iron. An office building 108 x 250 feet will also be erected.

The American Tube and Iron Company, at Middletown, Pa., have contracted for a fuel gas plant having a capacity of 2,000,000 cubic feet per day.

Among newly-authorized corporations in Illinois are the following: Columbia Horse Nail Company, Chicago, to manufacture and deal in horseshoe nails and hardware supplies; capital stock, \$45,000; incorporators, Frank A. Baxter, Charles J. Radcliffe, Lyman H. Eastman, James L. McEvoy. Beery Valve Company, Chicago, to manufacture and sell machinery and appliances made of metal or wood; capital stock, \$10,000; incorporators, Samuel M. Beery, Herbert E. Keeler and Carrie F. Price. The Simpson Storage Battery Company, Chicago, to manufacture, deal in and use electrical supplies, machinery, storage batteries and electrical appliances; capital stock, \$10,000; incorporators, H. M. Day, H. B. Hallock and C. P. Chapman. The Illinois Cycle Company, Chicago, to manufacture and sell bicycles and other kinds of vehicles; capital stock, \$60,000; incorporators, L. P. Halladay, William H. Halladay and Francis W. Parker. The Wheeler & Tappan Company, Chicago, to manufacture and deal in steam pumps, machinery and appliances; capital stock, \$150,000; incorporators, Thomas J. Wheeler, Amos K. Tappan and F. Griffen. Moline Spring Works, Moline, to manufacture and sell all kinds of springs and iron and steel products; capital stock, \$15,000; incorporators, David R. Cowan, Jacob B. Snyder and Clarence E. Nason. Watseka Automatic Hinge and Mfg. Company, Watseka, to manufacture and sell automatic door and gate hinges; capital stock, \$33,000, incorporators, Emil H. Langhaus, S. L. Stiles, W. H. Harry and Joseph W. Fidler. The Gardner Steam Pump Company, Quincy, to manufacture steam pumps and other machinery; capital stock, \$50,000; incorporators, Robert W. Gardner, L. C. Neustadt and J. W. Gardner.

TRADE REPORT.

Chicago.

(By Telegraph.)

Office of The Iron Age, 50 Dearborn street, }
CHICAGO, April 15, 1891.

This year seems destined to be prolific of disturbing influences. The Western Coal miners' strike now looms up, and if it takes place as threatened—on May 1—business will shortly after be seriously demoralized. There will be some benefit accruing from it in the curtailment of Iron and Steel production, but the chances are that the consumption will for the time be even more curtailed. It is, however, deemed hardly possible that such a strike can last long enough to upset matters very seriously.

Pig Iron.—The feature of the past week was the break in Charcoal Pig Iron, followed by large sales for future delivery. Rumors of low prices had been current for some time, but they were not regarded as authentic up to a few days since. It is now stated on good authority that sales of several thousand tons have been made to large consumers who usually buy in midsummer, but who have concluded that the market is now about down to its lowest point, and that they had better buy when they have the opportunity to stock up at cheap prices. These parties have bought at not over \$17, so that the sales thus made are the lowest ever known in Charcoal Iron in Chicago. It is not believed that more than one or two furnace companies will sell at these low figures. Most makers will hold on to their present stock and blow out their furnaces rather than sell at this rate, which must mean a loss. Lake Superior furnaces are, in fact, known to be getting short of Charcoal, and several of them must soon shut down on that account alone, and remain out until they can accumulate a stock of fuel. A good business is also reported in local Coke Iron. The general foundries are buying more liberally, consumers inclining to the belief that present prices are low enough to stock up on, especially as a better demand for Castings is now perceptible. The building season is now on, and the architectural foundries see more work in sight than for several years at this time. At least one large building is to be erected with Cast instead of Steel columns, and Cast work is expected to enter largely into the construction of several others. Some foundries have covered their anticipated requirements for the remainder of the year. The prospects are that Softeners will be still more scarce after the 1st of May. Not only does the Coke strike drag along, but the situation will be aggravated by the Coal miners' strike, which may cause the Jackson County and Hocking Valley furnaces in Ohio, now running largely on Raw Coal, to blow out. Coke Bessemer Pig could have been purchased at \$16 the past week, but sellers have withdrawn from the market now. The carload trade in Southern Coke Iron has been quite active at old figures. Makers show more disposition to sell, and it is likely that concessions would be made on round lots. Warrants are still being offered cheap.

Bar Iron.—Further weakness is reported among sellers. The Mahoning Valley mills are quite firm at 1.55¢, at mill, half extras, and some of the nearer mills are also holding up prices, but there are others needing orders to keep going, and they are taking the limited business in sight at concessions on last week's figures. Car-Iron specifications have been taken at 1.55¢, at mill, for 500 tons, and on store specifications 1.60¢, with half ex-

tras, has been shaded. The outlook is so unsatisfactory that a number of mills may soon be expected to shut down to wait for better prices. Jobbers quote 1.80¢ @ 1.85¢, full extras, from store, and 1.75¢ for car lots.

Other Manufactured Iron.—Nothing new to report in Structural Iron, Sheets or Plates. For Plates quotations are: Nos. 10 to 14 Iron Sheets, 2.65¢ @ 2.70¢; Steel Sheets, 2.80¢ @ 2.90¢; Tank Iron, 2.50¢ @ 2.60¢; Tank Steel, 2.60¢ @ 2.70¢; Boiler Tubes, 55 % off up to 2½ inches and 60 % off on greater.

Merchant Steel.—Is featureless. Prices are nominally as before, viz.: Open-Hearth Machinery at 2.30¢ @ 2.65¢, Spring at 2.50¢ @ 2.75¢, Tire at 2.30¢ @ 2.60¢, and Bessemer Bars at 2.20¢ @ 2.30¢.

Track Supplies.—The first World's Fair contract for Iron or Steel in the market is one for 1300 tons Steel Rails and the necessary fastenings to lay freight tracks on the grounds. The placing of the Pennsylvania Railroad contract has cleared the Steel Rail situation of any uncertainty, and now the only change in prices to be expected by the railroads is in an upward direction. The bottom price here, to largest roads, is now \$31, but smaller buyers and new enterprises will not get in on these terms. A heavy trade in Steel Rails is expected inside of 60 days from present appearances. Light Rails are in good demand. Iron Splice Bars are quoted at 1.85¢ @ 1.90¢; Spikes at 2¢ @ 2.10¢, and Hexagon Nut Track Bolts at 2.85¢.

Old Rails and Wheels.—A sale of a small lot of Old Iron Rails is reported at \$22.60, Chicago, and another lot was sold at \$22.50, delivered at a Western mill. Holders of large lots report \$23 bid and refused, while consumers say they are now disinclined to bid over \$22. The supply of Old Iron Rails is so inconstant, and consumers are so peculiarly situated at present, that it is impossible to tell whether prices will be lower or not. Old Steel Rails are dull. Inquiries are at hand from Pittsburgh, but local prices are too high to do business, say, \$18.50 @ \$17, according to length. Car Wheels are so dull that it is hard to get a quotation on them. They are nominally worth \$16.50.

Scrap.—Trade is not so lifeless as it was. High grade Scrap is moving to some extent, but cheap material is dull, and Steel is wholly neglected. Railroad Wrought has been bought by consumers from railroads direct at \$18 @ \$18.25 and Mill Scrap at \$13.25; Borings at \$7.50 @ \$7.75. Dealers quote selling prices per net ton same as last week, viz.: No. 1 Railroad, \$18.50; No. 1 Forge, \$18 No. 1 Mill, \$13.50 @ \$14; Fish Plates, \$21; Axles, \$24; Pipes and Flues, \$12.50 @ \$13; Horseshoes, \$18; Cast Borings, \$8 @ \$8.50; Wrought Turnings, \$11.50; Axle Turnings, \$13; Machinery Cast, \$12; Stove Plates, \$8.50 @ \$9; Mixed Steel, \$11; Coil Steel, \$15; Leaf, \$16; Tires, \$18.

Metals.—Copper is improving its condition steadily, but Casting brands are still to be had at 11.75¢, and Lake at 14.25¢, in carload lots. Spelter is unchanged at 5¢ @ 5½¢, according to brand. In Pig Lead the week has been quiet, and dealers report that prices have experienced a sharp decline. Complaints on every side are of light demand for the manufactured article, Sheet, Pipe, Shot, &c. The closing is dull at 4.05¢ asked, 4¢ bid. The St. Louis market has steadily declined from 4.07½¢, the opening price, to 4.05¢ and 4¢, with sales of 200 tons desilverized at the latter price.

The Oliver Iron and Steel Company of Pittsburgh have recently established a

Western office at 322 Dearborn street, Chicago, which is in charge of P. W. Herzog, for the sale of I Beams, Channels, Plates, Angles, Tees, and Zee Bars, in either Iron or Steel. Mr. Herzog also represents the Schultz Bridge and Iron Company of Chartiers, Pa.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., April 14, 1891.

There is so little change in the condition of the market that last week's report would very correctly define the position to-day. In some respects there is increasing confidence in the ultimate outcome, but it does not manifest itself in prices, which in some leading specialties are barely equal to those quoted a week ago. More than ordinary attention is being directed toward the Steel trade, which some well-informed parties think is the pivotal point, and that the demand for Steel Rails will be followed by increasing firmness in Steel in other forms, and from that extend to all other departments. There is not much immediate demand, however, although some 40,000 tons were taken by Eastern mills during the past week, but the general financial position, as reflected in the recent important advance in railway securities, gives promise of a much better demand for supplies and equipments. This may not be realized immediately, but if crop reports continue as favorable as they have been for some weeks past, and the roads continue in harmony, there is a magnificent foundation for a big fall trade. To summarize the position in a few words, it may be said that the trade are not troubling themselves very much with the immediate condition of affairs, which may drift along as they have done for several weeks past, but looking beyond the present every one feels convinced that a splendid improvement is only a matter of time, and perhaps not a very long time either.

Pig Iron.—So far as this market is concerned prices are just about steady. Buyers cannot be coaxed into any extensive engagements at present prices, and as sellers are by no means convinced that they ought to make concessions, business is of the same featureless character as so often reported during the past few months. There is plenty of Iron to go around, notwithstanding the immense reduction in the output, but once the corner is turned and prices begin to advance, what is an ample sufficiency now might become quite a scarcity then, even if the actual consumption was very little greater. It makes a lot of difference when everybody is determined to buy for three or four months ahead, instead of merely covering immediate requirements. There is said to be an axiom in the stock market which to some extent would apply to the Iron trade—viz: "The first 5 % advance is brought about by speculation by rich operators, the second 5 % is by bears covering, and the third 5 % is taken from the lambs that come in to be shorn." Nevertheless, whatever degree of truth there may be in that as a general statement, it does not apply to the Iron trade of Eastern Pennsylvania, as it would have done ten or 15 years ago. And it is equally a matter of record, as shown by *The Iron Age* reports of last winter and spring, that when certain markets in the West were "booming" at the rate of \$4 to \$6 per ton, this old-fashioned market responded very unwillingly to the extent of \$1.50 to \$2, and as "what goes up has got to come down," the trade hereabouts had a much less anxious time than those who went so very much higher, and therefore had to take so much heavier tumble before they got back to the ground floor. These remarks are suggested by the

fact that ironmasters and consumers in this vicinity have an absolute conviction that this country can meet every legitimate consumptive requirement at moderate prices, and that any attempt, and every attempt, to get up a "boom" will meet with emphatic disapproval. What they most desire is a steady market at steady prices, and although present quotations are too low, considering the cost of production, they neither expect nor wish to see a rise of more than a couple of dollars at the very most, and half of that is nearer to the ideas of many of the leading makers. Present quotations for lots delivered in consumers' yards are about as follows:

Ohio Softeners, No. 1x.....	\$19.00 @	\$19.50
Ohio Softeners, No. 2x.....	18.00 @	18.50
Standard Penna., No. 1x.....	17.50 @	18.00
Standard Penna., No. 2x.....	16.50 @	17.00
Medium Penna., No. 1x.....	17.25 @	17.50
Medium Penna., No. 2x.....	16.00 @	16.25
Virginia, No. 1x.....	16.75 @	17.50
Virginia, No. 2x.....	15.75 @	16.00
Standard Neutral All-Ore Forge	14.75 @	15.25
Ordinary Forge Cinder mixed ..	14.00 @	14.25
Charcoal Car-Wheel Iron.....	21.00 @	25.00

Muck Bars.—There is not much change in this department. Buyers have been trying to get prices down, but their necessities got the best of them, so that purchases have been made within the past few days at \$26, f.o.b. cars at seller's mill, probably equal to \$26.60, delivered. Some holders are firm at \$27, but they are making no headway, and prospects do not appear to be very encouraging at present.

Steel Slabs and Billets.—The market is still without decided features, and in the absence of anything like a general demand it is difficult to say within 50¢ per ton what the market is. Probably \$27.50 for Slabs and \$27.75 for Billets would be fair quotations for deliveries around here, and 25¢ @ 50¢ less for deliveries more toward the interior.

Steel Rails.—Orders are coming in more freely, and mills are beginning to feel a little crowded for early deliveries. Sales to the extent of 40,000 tons have been made recently, and as there is a steady influx of small orders, manufacturers begin to see an active business in the near future. Prices are firmly maintained at \$30 at mills, and if the demand improves, as seems probable, there may soon be a small premium on early deliveries.

Ferromanganese.—There is a fair demand for small lots, which are now quoted \$64 and upward for 80 %. Several sales of small lots from store at about \$63.50 @ \$63.75.

Bar Iron.—There is little that is new or of interest in this department. The demand is in some cases reported to be a trifle better, but no large lots are called for, so that most of the mills are running on such orders as can be secured from week to week. A few good-sized orders from the car shops about this time would be a relief to the market, and although such orders ought to be around soon, there is nothing of the kind offering at present. Prices for medium quality Bars are quoted at 1.65¢ @ 1.70¢, and for best refined 1.75¢ @ 1.85¢, price varying according to quantity, specification of sizes and requirements as to quality.

Skelp Iron.—There is a slightly better demand, but prices remain at from 1.70¢ @ 1.75¢, delivered, for Grooved, and 1.85¢ @ 1.90¢ for Sheared.

Plates.—The general demand for small lots shows some little improvement, but the absence of large orders is still an insuperable obstacle to improvement in prices. Mills must accumulate a moderate amount of work before they can venture upon asking higher prices. At present quotations are very irregular, and in some cases are materially lower than nominal prices, which for lots delivered in consumers' yards are about as follows:

	Iron.	Steel.
Ship Plates.....	2.00 @ 2.10¢	2.05 @ 2.10¢
Tank.....	2.00 @ 2.10¢	2.05 @ 2.10¢
Bridge Plate.....	2.05 @ 2.15¢	2.15 @ 2.20¢
Shell.....	2.20 @ 2.30¢	2.30 @ 2.40¢
Flange.....	3.10 @ 3.20¢	2.50 @ 2.60¢
Fire-Box.....	3.75¢	3.25 @ 3.75¢

Structural Material.—The movement is not specially active, although a good deal of important work is developing, which will undoubtedly cause great activity as the season advances. For the present quotations for lots delivered in consumers' yards are about as follows: Angles, 2.05¢ @ 2.10¢; Sheared Plates, 2.05¢ @ 2.10¢, and 10¢ @ 15¢ more for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Sheet Iron.—The demand is a little slow at the moment, but some very nice orders have been taken in, and mills are running pretty well to their full capacity. Prices are irregular, but as a rule quoted about as follows:

Best Refined, Nos. 14 to 20.....	3.00¢ @ 3.10¢
Best Refined, Nos. 21 to 24.....	3.10¢ @
Best Refined, Nos. 25 to 26.....	3.20¢ @ 3.30¢
Best Refined, No. 27.....	3.40¢ @
Best Refined, No. 28.....	3.50¢ @

Common, ¼¢ less than the above.
Best Soft Steel, Nos. 14 to 20..... 3 ¢ @ 3½ ¢
Best Soft Steel, Nos. 21 to 24..... 3½ ¢ @
Best Soft Steel, Nos. 25 to 26..... 3 ¢ @
Best Soft Steel, Nos. 27 to 28..... 4 ¢ @
Best Bloom Sheets, ¼¢ extra over the above prices.

Best Bloom, Galvanized, discount..... @ 65 ¢
Common, discount..... @ 67½ ¢

Old Rails.—Only an occasional transaction is reported, one during the week being at \$23.50, delivered, at a mill in the interior, but there is no demand for sea-board lots.

Scrap Iron.—Market irregular, varying from quoted rates 50¢ to \$1 per ton, according to quality. For such quantities and qualities as buyers approve, sales have been at about the following quotations: No. 1 Railroad Scrap, \$22 @ \$23, Philadelphia, or for deliveries at mills in the interior, \$22.50 @ 23, according to distance and quality; \$15 @ \$16 for No. 2 Light; \$14 @ \$15 for best Machinery Scrap; \$13 @ \$14 for ordinary; \$15 @ \$16 for Wrought Turnings; \$10 @ \$10.50 for Cast Borings, and nominally \$25 @ \$26 for Old Fish Plates, and \$17 @ \$18 for Old Car Wheels. Sale of Car Wheels a few days ago at \$17, delivered.

Wrought-Iron Pipe.—Demand slightly better, and at the reduced prices there is a steadier market, with some prospect of improvement in the near future. Some of the mills intimate their intention of shutting down, as they say they cannot make Pipe at the prices now ruling without an actual loss. Discounts quoted as follows:

Butt-Welded Black.....	57½ %
Butt-Welded Galvanized.....	50 %
Lap-Welded Black.....	67½ %
Lap-Welded Galvanized.....	55 %
Boiler Tubes, 2½ inch and under.....	55 %
Boiler Tubes, 2½ inch and larger.....	60 %

Cleveland.

CLEVELAND, April 13, 1891.

Iron Ore.—There has been considerable discussion during the past week over vessel rates, but no schedule has been adopted. It seems quite probable that Ore will be brought down from Ashland at about \$1 per ton, but a glance at the great stacks now on the docks awaiting shipment makes all speculation concerning new Ore seem superficial. But a small effort is being made to get this Ore to the furnaces and navigation will open with considerably over 1,250,000 tons of the 1890 product heaped up on the Lower Lake docks. Eastern furnaces are making numerous inquiries concerning prices for 1891, but are only able to get estimates. Local dealers deny emphatically that any non-Bessemer Ore has been sold except,

perhaps, conditionally, and then only in limited quantities. It seems quite probable that a very good quality of Gogebic Bessemer will sell this season for \$4.50 @ \$4.65, and that other Ores will be sold on about the same basis.

Pig Iron.—There are absolutely no new developments beyond the fact that one or two dealers, who have been holding small lots of Bessemer for \$17, have let go their Iron at slightly lower figures. The market is excessively dull, and a most careful canvass of the local Pig-Iron offices fails to develop any new features of interest. Dealers say they are hopeful, but it is not exactly apparent why they are. Certain it is that affairs could not well be worse, and that any change at all must, of necessity, be in the nature of an improvement. Perhaps the above is an explanation of the hopeful feeling above referred to.

Old Rails.—There have been sales during the past week of Old Americans at \$24 @ \$24.50, but the market is not very active.

Manufactured Iron.—The market is fairly firm. Sheets are in very good demand. Common Bar is selling in small lots at 1.65¢.

Scrap.—Not very much is being done, although an occasional sale of No. 1 Railroad Wrought is reported at \$20.50 @ \$21.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date April 13, 1891, say: Trade still continues very slow and disappointing. In fact there is very little trade on which to base definite prices. The leading Iron on the list to-day is Lake Superior Charcoal, but this is the natural time for the commencement of the buying of this Iron, and certain lots are being booked for early navigation delivery, and we also have learned of some transactions for delivery late in the summer. Prices, however, are no better than they have been, but they certainly are no worse, and it is now a well established fact that the market cannot be further pushed down. Rumors of a general strike among the miners in Ohio and Pennsylvania should, we think, have a tendency to stimulate some buying within the present month of Northern Coke Irons, and possibly raise figures to some extent. The market, except for Lake Superior Charcoal, is almost lifeless; quotations are as follows:

Lake Superior Charcoal, all numbers	\$18.50 @ \$19.00
Lake Superior Coke, Bessemer	18.00 @ 18.50
Katahdin (Maine Charcoal)	23.50 @ 24.00
Lake Superior Coke Foundry, all ore	18.00 @ 18.50
Ohio Blackband (40 per cent.)	18.00 @ 18.50
Southern No. 1	16.25 @ 16.75
Southern Gray Forge	14.75 @ 15.25
Jackson County (Ohio) Silvery	18.25 @ 18.75

Louisville.

LOUISVILLE, KY., April 13, 1891.

Pig Iron.—The market is very dull, with no sales of moment. Buyers are withholding from buying at the present, not on account of prices, but because they have no work, and the prospects for future business appear at the present moment poor. Car companies report Western railroads with greatly decreased tonnage, and that some roads have large numbers of their cars side-tracked for want of freight. Purchasing agents of railroads state that they are advised that the crops bid fair to be exceedingly good, and that by June they can be reasonably certain of what tonnage may be expected, and that if the present indications materialize into heavy crops, it is felt that the demand for cars will be heavy and lead to large orders, but that same depend entirely upon the

crops, and if they should be affected by drouth or other causes, the future, from their standpoint, for buying more material is very poor. It is reported among the pipe foundries that their business is falling off; that their orders are scarce and prices low. It is thought that the amount of Iron bought by them will be smaller than usual; a number of the larger companies at the present moment are not running full time. Car Wheel Irons remain firm, furnaces taking a positive stand on basis of present prices. Buyers, however, instead of purchasing in large amounts, are only buying from month to month. We quote:

Southern Coke, No. 1 Foundry	\$14.50 @ \$15.00
Southern Coke, No. 2 Foundry	13.75 @ 14.25
Southern Coke, No. 3 Foundry	13.25 @ 13.75
Southern Coke, Gray Forge	12.75 @ 13.25
Southern Charcoal, No. 1 Foundry	16.00 @ 17.00
Southern Car Wheel	17.00 @ 20.00

Pittsburgh.

Office of The Iron Age, Hamilton Building, Pittsburgh, April 14, 1891.

Pig Iron.—There has been little or no change in the situation the past week; furnacemen and brokers continue to report business as dull and unsatisfactory and the outlook unfavorable. Demand continues restricted to supplying immediate wants, consumers generally refusing to anticipate the future, while prices are weak and unsettled, with the buyer expecting to buy at a lower price every time he wants to purchase. The Coke strike continues, and the prospect for an early termination is no better, apparently, than it was a week ago. It would naturally be supposed that, in view of the strike, by reason of which production of Pig Iron has been very much reduced, Iron would be getting scarce, but the mills appear to have no trouble in getting all they want, which is not very much. We quote prices as follows:

Neutral Gray Forge	\$14.00 @ \$14.50, cash
White and Mottled	13.50 @ 13.75, "
All-Ore Mill	15.00 @ 15.50, "
No. 1 Foundry	15.50 @ 16.00, "
No. 2 Foundry	14.75 @ 15.00, "
No. 1 Charcoal Foundry	23.50 @ 24.00, "
No. 2 Charcoal Foundry	21.50 @ 22.00, "
Cold Blast Charcoal	25.00 @ 28.00, "
Bessemer Iron	15.75 @ 16.00, "

There was a sale of 3000 tons of Bessemer Iron reported at \$15.75, cash. Several sales of Forge Iron in the Mahoning and Shenango valleys to consumers are reported at \$14.20 @ \$14.25, which shows that it is worth about as much there as here, as good brands are to be obtained here at \$14.25, cash. There is still more or less Southern Iron coming into this as well as the Wheeling district. So far as known there have been no Ore contracts made, either here or in the valley, and it is very evident that furnacemen intend to keep themselves in position to take advantage of lower prices.

Muck Bar.—Market dull and prices weak and drooping. We now quote at \$26 @ \$26.50, with a sale of 1000 tons reported at \$26.25. There is a good deal offering, both for immediate and future delivery, and it looks as if prices would go still lower, hence it is not strange that the demand continues light.

Ferromanganese.—There is no improvement in demand, but the local market is firmer under the influence of recent advance at the seaboard; while there have been no late sales, 80 % domestic is now quoted at \$65.50 @ \$66. There has been but little inquiry for some considerable time past, and when there is it is only for a small lot.

Manufactured Iron.—The demand continues light, but it is expected to improve as the season becomes more advanced; what is wanted more than anything else is some good weather, so that outdoor work can be resumed. Not only is the general trade slow and unsatisfactory, but the railroads appear to be doing

nothing in the way of making repairs or improvements, and they are buying very sparingly in sequence. Prices continue weak and irregular; as desirable orders are being solicited there is a disposition to cut prices in order to obtain the same. Best city-made Iron is quoted at 1.70¢ @ 1.75¢ for Bars; 2.10¢ @ 2.15¢ for Plate and Tank; and 2.80¢ @ 2.85¢ for No. 24 Sheet, 60 days, 2 % off for cash. Bars are quoted at 1.60¢ @ 1.65¢, half extras, on cars at valley mills. Skelp Iron is lower; sales of Grooved reported at 1.65¢ @ 1.70¢, and Sheared at 1.85¢ @ 1.90¢, four months, 2 % off for cash.

Nails.—There is a fair business reported in Cut Nails, but prices continue weak, and to makers unsatisfactory. Sales reported of 30¢ average at \$1.55 to \$1.60, 60 days, 2 % off for cash. A sale was made recently at about \$1.85, delivered at New Orleans. The factories in the Wheeling district, according to latest intelligence from that place, appear to be pretty well employed. In regard to Wire Nails trade is generally reported dull and prices weak and drooping. Manufacturers continue to quote at \$2.10, 60 days, 2 % off for cash, but a broker reports that he offered to sell at \$2.05 and failed to get the order. There appears to be little or no demand; a number of large contracts were placed during January and February, and the large buyers appear to be well supplied. There is not much doubt, however, but what business will improve later on, provided the labor troubles now so common are adjusted.

Barb Wire.—Trade is generally reported slow and prices are quoted as before. It is intimated that a desirable order would probably be placed below the regular syndicate rates, which are quoted: Glidden Painted, 2.85¢; do. Galvanized, 3.40¢; Four Point Painted, 2.80¢; do. Galvanized, 3.35¢, in car lots, f.o.b. at makers' works.

Steel Plates.—But little new business reported recently; prices remain unchanged: Fire Box, 4.25¢ @ 4.50¢; Flange, 2.75¢; Shell, 2.55¢; Tank, 2.20¢.

Merchant Steel.—Demand continues light, and while we make no change in our quotations, the tendency is in buyers' favor. Bessemer Tool Steel, 7¢ @ 8¢; do. Machinery, 2½¢; Crucible Machinery, 5¢; do. Spring Steel, 4¢; Bessemer Spring Steel, 2½¢; Tire Steel, 2.20¢; Steel Bars, 2.20¢.

Structural Iron.—Business continues in an unsatisfactory condition, and the outlook for improvement is not as encouraging as it might be. A great many contemplated improvements are being held back in consequence of labor troubles. They are still in the hands of the architects, and it is feared some of them will be abandoned or held over until next year. Prices remain unchanged, as follows: Channels and Beams, 3.10¢; Angles, 2.05¢; Steel Sheared Bridge Plates, 2.30¢; Universal Mill Plates, Iron, 2.10¢; Refined Bars, 1.85¢ @ 1.90¢.

Wire Rods.—There does not appear to be much inquiry, and some of the mills, it is said, are soliciting business. Prices are quoted nominally at \$37 @ \$37.50 for domestic, f.o.b. at makers' mill.

Billets and Slabs.—Manufacturers continue to quote at \$25.50 @ \$26, at mill, according to delivery and character of order, but it is intimated that a desirable order might be placed at \$25.25 or even \$25, as some makers, it is understood, are anxious for business. However, one of the largest firms here reports that up to the present time they have made no sales under \$25.50. There is no disguising the fact that the drift of the market is downward.

Old Rails.—The dullness noted for some time past continues, and prices are weak, but without quotable change. Some dealers look for an improved demand in the near future. Old Steel Rails, \$17 @ \$17.50 for short pieces; sales of Iron Rails at \$24 @ \$24.25; light sections at \$23.50. The stock of Iron Rails is small, and with anything like an improvement in the demand the market would no doubt soon stiffen up.

Wrought-Iron Pipe.—There is no change in the situation; business continues light, but is expected to improve as the season becomes more advanced. Prices remain unchanged. Discount on Black Butt Pipe, 57½ %; on Galvanized do., 50 %; Black Lap, 67½ %; Galvanized do., 55 %; Boiler Tubes, 2½ inch and smaller, 55 %; 2½ inch and larger, 60 %; Casing, all sizes, 55 %.

Steel Rails.—Heavy sections are still quoted at \$30, f.o.b. at mill. The Edgar Thomson Works have not yet been started up and it is said will not be until the close of the coke strike.

Railway Track Supplies.—There is no improvement in demand; prices remain unchanged. Spikes, \$2.05, 30 days, f.o.b. at makers' works; Splice Bars, 1.90¢ @ 2¢; Track Bolts, 2.80¢ with Square and 2.90¢ with Hexagon Nuts.

Old Material.—Demand continues light, while prices are weak. Sales of No. 1 Railroad Wrought Scrap at \$20 @ \$20.50, net ton; Iron Car Axles \$27.50 @ \$28; Cast Scrap, \$14 @ \$14.50, gross; Old Car Wheels, \$17; Cast Borings, \$11 @ \$12; Steel Rail and Bloom Ends, \$17 @ \$17.50.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, April 15, 1891.

The market has continued in a very quiet condition, about the only movement of consequence being on back orders, and as large consumers are obtaining all they require for current consumption, the volume of traffic is unusually small. There is some inquiry for delivery at low prices, but as a rule the furnaces refuse to entertain such bids, thinking that there is a better outlook for the future, there being little if any margin of profit in the rates obtainable. The production of Northern and Southern furnaces is much curtailed, otherwise there would be an avalanche which nothing could withstand. The expected increase in the demand for the finished product has not yet become apparent, and until it does there can be little hope of a material improvement in Pig Iron. Melters of Iron, as a rule, are working with moderation, and do not increase their holdings of Pig Iron until there are some signs of a turn in the market. There have been no actual transactions reported at lower prices; in fact, pretty full previous prices are obtained for the moderate quantities selling. Duplicate orders for 500 tons Gray Forge have been placed at a little lower rates, but the exact figures have not transpired. Current quotations are given below: Foundry Southern Coke No. 1, \$15 @ \$15.25; Southern Coke No. 2, \$13.75 @ \$14; Southern Coke No. 3, \$13.50 @ \$13.75; Ohio Soft Stone Coal No. 1, \$16.50 @ \$17; Ohio Soft Stone Coal No. 2, \$15.50 @ \$16.50; Mahoning and Shenango Valley, \$17.50 @ \$18; Hanging Rock Charcoal No. 1, \$21 @ \$22; Hanging Rock Charcoal No. 2, \$19.50 @ \$20.50; Tennessee and Alabama Charcoal No. 1, \$16.50 @ \$17.50; Tennessee and Alabama Charcoal No. 2, \$17 @ \$18; Gray Forge, \$12.75 @ \$13; Mottled Neutral Coke, \$12.50 @ \$12.75. Car Wheel and Malleable Irons—Southern Car Wheel,

\$18.50 @ \$20.50; Hanging Rock, Cold Blast, \$20 @ \$22; Lake Superior Car Wheel and Malleable, \$19.50 @ \$20.50.

St. Louis.

Office of *The Iron Age*, 214 N. Sixth st., St. Louis, April 13, 1891.

Pig Iron.—There is little or no change to note since our last report. There is only a fair demand, and prices show no particular change. Consumers appear to have ample supplies to meet their requirements, and are not in the market for any large quantities. Furnacemen do not feel disposed to shade prices to any extent, and this fact, coupled with the scarcity of Southern Iron, may lead to some improvement as regards prices. The local demand is fairly active, but only in small quantities, giving the appearance of a hand-to-mouth market. It is difficult to make any prediction regarding the future, although it seems quite probable that with a fair degree of activity during the present month a higher range of values will result. Sales during the week, as stated above, have been in small quantities at current prices. We quote as follows for cash f.o.b. St. Louis:

Southern Coke, No. 1 Foundry.....	\$16.00 @ \$16.25
Southern Coke, No. 2 Foundry.....	15.00 @ 15.25
Southern Coke, No. 3 Foundry.....	14.50 @ 14.75
Gray Forge.....	14.00 @ 14.25
Southern Charcoal, No. 1 Foundry.....	17.50 @ 18.00
Southern Charcoal, No. 2 Foundry.....	17.00 @ 17.50
Missouri Charcoal, No. 1 Foundry.....	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry.....	15.00 @ 15.50
Ohio Softeners.....	18.00 @ 19.00

Bar Iron.—Some improvement can be noted in this department. Mills are fairly well employed, and they have enough work on their books and in sight to keep them in that condition. We quote as follows: Lots from mill command 1.65¢ @ 1.67½¢. East St. Louis jobbers quote 1.80¢ @ 1.85¢ from store.

Barb Wire.—A fairly active trade is reported in this department. The improved weather of the last week has benefited trade considerably, and the country districts are sending in long-deferred orders. Prices are firmly adhered to, as follows: Painted from mill, 2.95¢; Galvanized; 3.50¢, carload lots 10¢ per hundredweight less than above prices.

New York Metal Exchange.

The following sales are reported:

THURSDAY, April 9.	
25 tons Tin, April.....	30.25¢
FRIDAY, April 10.	
10 tons Tin, spot.....	20.10¢
25 tons Tin, May.....	20.00¢
35 tons Tin, April.....	20.10¢
25 tons Tin, delivery April 13.....	20.10¢
MONDAY, April 13.	
25 tons Tin, May.....	20.10¢
TUESDAY, April 14.	
100 tons Tin, April.....	20.10¢
100 tons Tin, May.....	20.00¢

Financial.

Spring trade has been retarded by a variety of circumstances, but slow buying by Southern merchants, who are first to appear in the New York jobbing trade, is attributed to a collapse in land speculation, and in the West the comparative barrenness of the grain markets goes far to account for the absence of buoyancy in the Northwest. True, the volume of sales in the first two months was largely in excess of the corresponding period in former years, despite the conservative tone of the South, but inaction was more apparent as the season advanced. The silver coinage

question and other disturbing causes at Washington checked the return of confidence, which had been severely shocked, and financial disasters here and there have tended to prolong the period of uncertainty. The discontent of labor, coupled with predictions of more open dissatisfaction, has also restrained the spirit of enterprise, large amounts of capital meanwhile remaining unemployed. At this later date foreign commerce is getting into better shape, imports slackening, while cotton and provisions have gone in greater abundance. More than all a potent factor is found in the excellent prospects for winter wheat, and a stronger assurance that remunerative foreign markets will be found. The possibilities of a European war have some little weight, deriving their strength from reported military movements and the persistent attempts of Russia, Germany and France to accumulate gold. The April returns to the Department of Agriculture make the condition of winter wheat 96.9, and of rye 95.4. The season for seeding was favorable over the whole winter wheat area. The general average is the highest reported for April since 1882, and the individual State averages are remarkable for their uniformity. It is 16 points higher than last year, and three above the returns for 1889. The Governor of North Dakota says the indications are the best for seven years. In California crops look better than since 1880. Experts familiar with crop statistics foreshadow a yield of 368,000,000 bushels of winter wheat, or 118,000,000 more than last year, and as the price per bushel is 20¢ higher, the increased valuation is a substantial item. Respecting exports, large deliveries are being arranged for the opening of navigation. Touching currency movements, it is observed at the Custom House that the proportion of receipts paid in gold has dropped from 80 % in January to less than 50 % in April, showing the extent to which the Government is using in its disbursements silver certificates and Treasury notes, which the banks can use only as they may be returned through the Custom House.

United States bonds were steady, as follows:

U. S. 4½, 1891, registered.....	101¾
U. S. 4½, 1891, coupon.....	101¾
U. S. 4s, 1907, registered.....	121¾
U. S. 4s, 1907, coupon.....	121¾
U. S. currency 6s, 1895.....	112

On Tuesday the Gould specialties dropped, on news of the adjournment of the Western Association Advisory Board for lack of a quorum. It was announced in Paris that the German Government had decided to conclude commercial treaties with Belgium, Switzerland and Italy, in addition to the commercial treaty now in progress of conclusion between Germany and Austria.

In bank stocks 100 shares of Western National sold at 100, 50 shares of American Exchange at 155½, 50 shares of Bank State of New York at 109, 10 shares of Fourth at 171, and 5 shares of Manhattan at 175. Silver bullion certificates sold at 97½. Bar silver in London, 44½d. The bank statement showed a loss of only \$770,025 in surplus reserve. This leaves the total surplus \$5,612,950. Deposits increased \$475,300 and loans \$1,078,100. The movement of money to the West and South continues in excess of the receipts. Time money is quoted 5 ¢ cent. for all periods up to 6 months, on good mixed collateral. Commercial paper is very slow of sale. Prime endorsed bills receivable are quoted at 5 @ 5½ ¢ cent., and first-class single-name paper at 6 @ 6½ ¢ cent. The banks are not in position to buy large lines, owing to the heavy drafts made upon them to enable the export of gold.

Stocks have shown a reactionary tendency, interrupted by gold exports, \$1,000,000 having been ordered for Berlin

and Paris. Thus, within a few days, \$4,000,000 have been taken on direct orders from the Bank of France and the Bank of Germany. It is stated that the coin going to Berlin will all be added to the stock of gold there, and will be available for reshipment in the future. Bankers intimate that \$8,000,000 more may be required, and although so large exports in April are almost unprecedented, the circumstance is by no means regarded as ominous. The London selling was said to be of short stock, and based upon the unsettled feeling abroad in connection with the South American complications. The buying of both Atchison and Missouri Pacific was traceable to a report that Mr. Gould's trip West will result in a virtual amalgamation of those roads. The trust properties seem to be unfavorably affected by the dissolution of the Chicago Gas Trust. The alleged belligerent intentions of the Italian Government had no influence. At the close, influenced by lower prices in London, which were due to dearer discounts and the expectation that the Bank of England rate will be advanced on Thursday, our market was a little irregular.

Exports of merchandise from New York for the week \$7,801,000, and since January 1, \$102,746,000, against \$99,424,000 for the same time last year. Imports do. to April 1, \$134,390,000, against \$125,800,000 in 1889.

The merchandise markets, excepting grain and sugar, are quiet. Wheat active, unsettled. Corn unsettled. Flour held higher and quiet. Pork irregular. Lard better. Other products dull and steady. Wool quiet. Cotton weak. Coffee about steady.

It is understood that the majority of the smaller national banks in the State of Kansas will reorganize under the new banking law passed by the Legislature. Quite a number of these institutions have already notified the Secretary of State of their intention of taking this step. The new law provides ample protection and allows lighter capitalization. Private banks are expected to follow suit. Several new banks are starting up in several parts of the city. One, to be called the Plaza Bank, is to be situated near the entrance to the Park. The Astor Place Bank will be the name of an institution near Astor place. The Windom Bank is to be the name of the bank projected in place of the ill-fated North River Bank. The Washington National Bank, equally unfortunate, will be wound up. The aggregate clearings of 59 cities for the past week were \$1,879,956,533, an increase of $\frac{1}{10}$ of 1%. Outside New York the decrease was $\frac{1}{10}$ of 1%. New York increased $\frac{1}{10}$ %.

The east-bound tonnage from Chicago last week was 62,600, against 69,800 last year. The President has accepted Treasurer Huston's resignation, and E. B. Nebeker of Indiana is expected to succeed him.

New York.

Office of *The Iron Age*, 96-102 Reade street, NEW YORK, April 15, 1891.

American Pig.—The market continues quiet, although this is not a matter of surprise to producers, who know that generally the duller time of the year is the first quarter, during which stocks are accumulated. The situation is very different this year, and there can be little question that the large restriction of output in the West is indirectly benefiting this market. Warrant Iron is being offered at low figures; \$9.60 was the best bid obtainable on Forge, Birmingham delivery, on a lot offered recently. The extreme range on Northern brands is \$17 @ \$18 for No. 1, \$16 @ \$16.75 for

No. 2 and \$14 @ \$15 for Gray Forge. Southern Iron sells at \$16.75 @ \$17.50 for No. 1, \$16 @ \$16.25 for No. 2 and \$14 @ \$14.25 for Gray Forge.

Spiegeleisen and Ferromanganese.—Only a small business is being done in Spiegeleisen, which is nominally \$27.50 @ \$28.50. Ferromanganese is held at \$64 @ \$64.25, the cheap lots having been absorbed. The foreign makers are asking £11. 10/ f.o.b., equivalent to \$63.75 delivered. It is hinted that the American makers are acting in harmony with the English producers.

Billets and Rods.—The Eastern market is dull. The only transaction of any magnitude is the placing of a lot of several thousand tons of Ingots, subject to approval of trial order, at private terms. Pittsburgh is reported to be selling Billets at \$25.

Manufactured Iron and Steel.—Business continues quiet. We quote Angles, 1.95¢ @ 2.10¢; Sheared Plates, 2¢ @ 2.25¢; Tees, 2.45¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 2¢ @ 2.15¢ for Tank, 2.35¢ @ 2.6¢ for Shell, and 2.6¢ @ 2.7¢ for Flange, on dock. Bars are 1.7¢ @ 1.9¢, on dock.

Merchant Steel.—We quote Machinery Steel, 2.05¢ @ 2.15¢ base, and Tire Steel, 1.95¢ @ 2.05¢ base.

Rail Fastenings.—We quote Spikes, \$1.90 @ \$1.95, delivered; Fish Plates, 1.75¢ @ 1.80¢, delivered, and Bolts, 2.75¢ @ 2.90¢, delivered.

Old Material.—Only one small lot of miscellaneous foreign Scrap has been sold during the week, at private terms.

Steel Rails.—Since last week the apathy of buyers has given way, and a number of railroads which have been holding off for some time past have been forced to enter the market in order to procure the material for spring repairs. There have been a good many contradictory rumors concerning the purchase of the Pennsylvania Railroad Company. We have it on good authority that its purchase amounts to 31,000 tons, distributed among the mills along the line of its road. The company had previously ordered at different times for repair work an aggregate of about 9000 tons. Further orders must be placed later on. The Erie Company have bought 4000 tons for immediate delivery and have an option for 6000 tons more, which will be placed as soon as reports of division superintendents are in. The New York Central have bought for the Rome, Watertown and Ogdensburg 9000 tons, which, with a purchase of 12,000 tons made last winter, leaves only a part of their requirements covered. The New York, Providence and Boston line have taken 1500 tons, 1000 tons have been purchased for immediate delivery for export to Mexico, and some minor sales and additions to former purchases foot up to about 2000 tons. It is reported, too, that the Lehigh Valley, which had already placed close upon 18,000 tons, had increased its order to 25,000 tons, and that the Mohawk and Northern, which it is insisted is not a connection of the New York Central, had added 5000 tons to its previous purchase. There has, therefore, been a good deal of activity, the most striking feature being that the majority of orders are for early shipments, thus showing that the railroads have been holding off to the last moment. The placing of the Pennsylvania order is generally the signal for buying on the part of many other lines, and this movement may, therefore, be looked forward to now. We underestimated the quantity of Rails thus far purchased in a recent issue. The official report shows that up to March 1 the mills

had booked for 1891 delivery 418,477 tons of standard Rails, of which Western mills took about 225,000 tons. Since then, including the sales just reported, there must have been placed so many additional orders as to bring the total up to 550,000 tons. The deliveries, however, have been exceedingly light thus far, having been probably less than 175,000 tons up to April 1, of which only about 65,000 tons are to be credited to Western mills. In other words, while under ordinary circumstances the mills run fairly well during the first quarter, the policy this year has been to hold back, notably in the West. Now the mills are rapidly getting into shape for steadier work, a fact which cannot help telling on the situation in raw materials. At least one of the Eastern mills has withdrawn the usual tidewater quotation of \$30.75 and quotes \$30 at mill, net. It is probable that this example may be followed by others in the near future. We quote \$30.75 @ \$31.25 at tidewater.

Warrant Stocks.—The American Pig-Iron Storage Warrant Company report as follows:

	Tons.
Stock in yard, April 1, 1891.....	54,700
Put in yard for 14 days ending April 14, 1891.....	.....
Total.....	54,700
Withdrawn 14 days ending April 14, 1891.....	1,300
Net stock in yard, April 14, 1891.....	53,500

New York Importations of Scotch Iron.

1886.....	46,000 tons.
1887.....	65,000 tons.
1888.....	43,000 tons.
1889.....	26,000 tons.
1890.....	9,500 tons.

These figures clearly show how this branch of the import business has dwindled into insignificance.

Crocker Brothers, 32 Cliff street, New York, have been appointed sales agents for the coke iron of the Roanoke Iron Company, Roanoke, Va.

T. D. Hazard, 80 Wall street, has just published in pamphlet form his Review of the Iron Trade of New York for the year 1890, prepared by him for the thirty-third Annual Report of the Chamber of Commerce of the State of New York. It contains, among other interesting data, the following statement of the importations of Scotch Iron at New York for a number of years:

Coal Market.

The Anthracite Coal trade drags, pending the action of the Lehigh Valley Railroad in the Coxe case, to be announced 20th inst. Will tolls be lowered, and, if so, will Coal, as a consequence, be sold at a lower price? This is the question that keeps sales in abeyance, one party being as slow to buy as the other to sell. On the part of operators they claim to have already made concessions in anticipation of lower tolls, to the prejudice of their own interests, in case the decision should be adverse. At the same time they would refuse to sell large blocks at the lowest price named. The situation, therefore, is abnormal. Operators claim that the actual reduction of the Coal output is putting the market in better shape. Prices of the steam sizes are stiffened and in some cases decidedly advanced, on account of scarcity. The sizes in request will be more plenty only as other sizes are prepared at the breakers. Broken, Egg and Stove, are \$3.60; Chestnut, \$3.35, net, f.o.b.; Pea is \$3 and Buckwheat \$3.90. The tip-top prices for Lehigh fancy brands are now quoted \$4, against \$3.90 two weeks

ago, and Egg \$3.85, which is also 10¢ per ton higher.

Production for the week ending April 4 was 597,818 tons, an increase of 80,420 tons. The total thus far since January 1 is 8,465,524 tons, compared with 6,682,562 tons for the same period last year. The demand for Steam Coal is about normal, other kinds very dull.

The Bituminous trade is reported very active, which may be ascribed to doubts respecting the continuance of full supplies, pending the proposed strike. Agitators adhere to their purpose, but producers profess to have little anxiety respecting the consequences, an eight-hour strike not being applicable to their system of mining by the ton. Interruption of supplies, however, would cause embarrassment.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, April 15, 1891.

Scotch warrants have been dull since early in the week, when quite heavy sales were made for "bear" account and some holdings closed out. Buying orders have been more plentiful the past few days, attracted doubtless by scarcity of Iron and the regularity with which stocks are decreasing. Latest sales were at 42/11 for Scotch, 38/ for Cleveland and 47/6 for Hematite.

Pig Tin prices improved early in the week under the influence of American demand. Subsequently, a reaction took place upon this demand being satisfied, but the market has again hardened, with some increase in outside speculation. In some quarters it is feared that Eastern production has been, or will be increased.

Copper ruled firmer on reports from America, but afterward receded, owing chiefly to the fact that some of the "bulls" exchanged cash warrants into three months' futures, rendering the supply of the latter abundant. Latterly the buying has improved, with the effect of stiffening prices, and holders express confidence in the future.

The Tin-Plate market has been firmer, but quiet. Buyers seem to have many orders in hand, but are waiting for easier prices. Makers threaten to consign Plates to the United States on their own account unless buying orders are forthcoming soon at fair prices. Stocks at shipping points amount to 521,000 boxes, against 538,000 boxes at the corresponding period last year. Last month's shipments were 47,000 tons, of which 38,000 went to the United States. Shipments in March last year were 26,000 boxes and 17,000 boxes respectively.

A strike is threatened in the Scotch Steel trade. The workmen of the Steel company refuse to accept the proposed reduction of 5% in wages.

Cleveland Pig.—There is only a moderate business, but prices are steady at 38/3 for No. 3 Middlesborough, f.o.b.

Bessemer Pig.—The market remains very quiet and prices have undergone no change. Makers quote 50/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Scotch Pig Iron.—Demand for makers' brands continues moderate and prices show little change.

No. 1 Coltness, f.o.b. Glasgow	64/
No. 1 Summerlee, " "	61/
No. 1 Gartsherrie, " "	60/6
No. 1 Langloan, " "	"
No. 1 Carnbroe, " "	49/
No. 1 Shotts, " at Leith	63/
No. 1 Glengarnock, " Ardrossan	"
No. 1 Dalmellington, " "	56/
No. 1 Eglinton, " "	50/6

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.

Spiegeleisen.—A very quiet market, with English 20% quoted at 95/, f.o.b. shipping port.

Steel Rails.—Demand has not improved and makers hold at former prices. Heavy sections quoted £4. 10/ and light sections £5 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—The movement is light and the market is flat, with sellers at £4. 7/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Inquiries are for moderate quantities only and few in number. Bessemer, 2½ x 2½ inches, quoted at £4. 10/, f.o.b. at N. W. England shipping point.

Steel Slabs.—There is no improvement in the demand, but prices remain steady. Bessemer quoted at £4. 10/, f.o.b. at N. W. England shipping point.

Old Iron Rails.—Little business passes, although the inquiry is fair. Bids are too low. Tees quoted at £3 @ £3. 2/6 and Double Heads £3. 2/6 @ £3. 5/, f.o.b.

Scrap Iron.—The market remains quiet, with prices barely steady. Heavy Wrought quoted at £2. 5/ @ £2. 7/6, f.o.b.

Crop Ends.—Very little demand and prices weaker. Bessemer quoted at £2. 15/ @ £2. 17/6, f.o.b.

Tin Plate.—Fair demand still and makers firm. We quote, f.o.b. Liverpool:

1C Charcoal, Alloway grade	18/9 @ 19/
1C Bessemer Steel, Coke finish	17/3 @ ...
1C Siemens	17/4 @ ...
1C Coke, B. V. grade	17/ @ 17/3
Charcoal Terne, Dean grade	16/9 @ ...

Manufactured Iron.—The market remains very quiet and prices are in buyers' favor, with no change, however, except on Welsh Bars. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Marked Bars	8 10 0	
Common	6 6 3	
Staff. Bk Sheet, singles	6 17 6	
Welsh Bars (f.o.b. Wales)	5 15 0	6 0 0

Tin.—market closes barely steady and dull, with Straits quoted at £90. 5/ spot, and £90. 10/ @ £90. 12/6 for three months' futures.

Copper.—No improvement in demand; prices barely steady. Merchant Bars quoted at £52, spot, and £52. 7/6, three months' futures. Best Selected, £57. 10/ @ £58.

Lead.—Demand has been moderate and prices are weak at £12. 10/ @ £12. 12/6 for Soft Spanish.

Spelter.—Prices a shade easier at £22. 15/ @ £22. 17/6, and the market quiet.

Metal Market.

Copper.—The market has been quiet. Even the periodical rumors of extensive transactions and variations in prices have failed to appear on the surface. Consumers, to all accounts, are buying only as imperative wants may dictate, and requirements, as reflected in the purchases making, are very little, if at all, larger or more urgent at the present time than they were a month ago. On the part of sellers there is no visible change. Orders are filled, with little ceremony, at about the same prices that ruled last week; but the offering by the mining companies and outside holders is reserved. At the moment 13½¢ is the popular quotation for Lake Superior product for either prompt or near future delivery. Whether that rate would be

shaded when it comes to the matter of actual business is uncertain. Arizona Ingot may be quoted at 12½¢ @ 12½¢, with the inside figures probably exceptional on ordinary sized lots. Casting Copper of good quality remains at about 11½¢ @ 11½¢, but a fraction less would probably secure inferior varieties.

Pig Tin.—Speculative operations have been on a smaller scale, and prices weakened about ½¢ from the highest point under the weight of realizations, coupled with slightly adverse cable advices from London. Rumors of a heavy shipment from London also had a tendency to check operations and cause an unsettled feeling. Lowest prices on actual sale were 19.95¢ for current month and 19.90¢ for May delivery. On Tuesday London prices were about 5/ up from the lowest point, leaving the local market relatively the lowest, or the reverse of the situation a week previous. Local and out of town trade demand has improved somewhat the past few days, and that fact, along with better London advices, served to give the market more tone for a time, but a decline of about 7/6 on Wednesday unsettled confidence and left a weak undertone at the close. Spot prices were about 19.95¢ @ 20¢, net cash, for 10-ton lots, and 20½¢ @ 20½¢ for jobbing quantities. Shipments from the Straits during the first half of April were posted on the Exchange as having been 825 tons to Great Britain and America and 150 tons to Continent.

Pig Lead.—Consumers have purchased sparingly during the week, and the demand from other sources has also been moderate, leaving the market spiritless up to this writing. The offering has continued free, with signs of anxiety to sell on the part of some smelters, even at the expense of a further slight concession in price. Single carloads were parted with at 4.25¢ @ 4.30¢, and for larger quantities 4½¢ and 4.20¢ has been accepted, while rumors were current of business at even less than the last named rate.

Spelter.—No change has taken place in the market for this metal. Neither galvanizers nor Brass manufacturers are buying with any liberality, and there is very little demand from other quarters. The offering, while fairly free, is not urgent, and while 5¢ would likely be accepted for prime Western in round lots, 5.05¢ is generally quoted for single carloads.

Antimony.—The demand still runs light and prices have moved downward, closing rather weak. Hallett's is quoted at 15½¢ @ 15½¢, LX at 16½¢ @ 16½¢ and Cookson's at 17¢ @ 17½¢ in wholesale quantities.

Tin Plate.—The situation is wholly unchanged. Large buyers are doing very little beyond caring for supplies that come forward and abiding events. The jobbing movement is hardly up to the average volume for the season. Quotations for large lots on the spot are as follows: Coke Tins—Penlan grade, IC, 14 x 20, \$5.25; J. B. grade, do., \$5.35; Bessemer do., \$5.25 @ \$5.30; Siemens Steel, \$5.50. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.75; Siemens Steel, IC basis, \$5.85 @ \$5.95; IX basis, \$6.85 @ \$7. IC Charcoals—Melyn grade, \$6.25; for each additional X add \$1.50; Alloway grade, \$5.85 @ \$5.95; Grange grade, \$6; for each additional X add \$1. Charcoal Terns—Worcester, 14 x 20, \$5.62½; 20 x 28, \$11; M. F., 14 x 20, \$7.50; do., 20 x 28, \$15; Dean, 14 x 20, \$5.15; do., 20 x 28, \$10.30; D. R. D. grade, 14 x 20, \$4.90; do., 20 x 28, \$9.90; Mansel, 14 x 20, \$5.05; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.05; do., 20 x 28, \$10.10; Dyffryn, 14 x 20, scarce, do., 20 x 28, \$10.62½. Wasters—S. T. P. grade, 14 x 20, \$4.85; do., 20 x 28, \$9.62½; Abercarne grade, 14 x 20, \$4.85; do., 20 x 28, \$9.50.

HARDWARE.

Condition of Trade.

THE CHIEF FEATURES of the business situation in different parts of the country are reflected in the reports given below from our special correspondents in the principal centers. From these it will be seen that while some complaint is made in regard to the volume of business, an improvement is noted and the prospect of a fair season's trade indicated. Business already seems to feel the effect of fine weather which has recently prevailed, and from a number of sources we learn of increased activity. Trade in New York City and vicinity is fairly active, and jobbing houses report in many instances a good business. There has been little change since last week in the tone of the market so far as prices are concerned, and Hardware generally is held at substantially the same figures as have been ruling for some time. While the market is not to be characterized as strong, prices are in general pretty well maintained, and manufacturers for the most part are pursuing a conservative course, avoiding undue accumulation of manufactured products and refraining from making exceptional concessions in order to induce sales. There is continued complaint in regard to the sluggishness of collections.

Chicago.

(By Telegraph.)

Shelf Hardware jobbers report business improving. The month's trade thus far is considerably ahead of that of March, but it is still below what it should be for the time of year. A few clear days last week made a noticeable difference in the volume of orders. Even staple goods picked up a little, but Shelf Goods continue to form the great bulk of the business now current. Steel goods and other seasonable articles are notably slow sellers this year. The Heavy Hardware trade is in good shape, with some houses reporting steady gains over the corresponding months of last year.

St. Louis.

(By Telegraph.)

The improvement noted in our last report continues. The demand for shelf goods shows some increase, and Heavy Hardware is coming in for its share of the trade. The demand for Sporting Goods is unusually heavy, and such seasonable articles as Bicycles, Tennis Outfits, &c., are in urgent demand. Wire Nails are slow to move, and prices are weak, with a downward tendency. Barb Wire is moving quite freely at full prices. Plain Wire is active, and prices are well maintained.

Reports from Southern and Western points indicate that stocks are light and will shortly need replenishing. Collections are above the average.

Baltimore.

CARLIN & FULTON.—The great demand now for Shovels and Spades, Hoes and Rakes, Gardening Tools of all kinds, Poultry Wire and Barb Fencing indicates activity in the agricultural sections, though we hear from all directions that the farmers are at least two weeks late in plowing and planting for the next season's crops. With the recent experience of the low and unsatisfactory prices of cotton following the immense crop of 1890, it is to be hoped that our Southern friends can be induced to give a greater variety to their products, giving more attention to wheat, corn, hay, and also to fruit. While the necessity and advantage of new methods of agriculture may not be universally appreciated, yet there is undoubtedly an improvement, the result of greater interest in farming by those who through the medium of newspapers, magazines and State associations give to the public the benefits of practical experience and scientific research. Remittances are probably up to the average, though in some sections where transportation is difficult accommodations have to be granted.

Louisville.

W. B. BELKNAP & Co.—Since last writing we have had a few days of sunshine, which has done wonders towards lifting business out of comparative dullness into something that is actually brisk. The sky had scarcely been clear a couple of hours when the streets seemed filled with teams and alert people as if by magic. Certainly the kiss of the prince in the old story could not have had an effect more instantaneous.

While there is no special anxiety on the part of buyers, neither is there any unusual desire to sell and prices are remarkably steady.

The Louisville and Nashville, our representative railroad shows increased earnings week by week. Freight business is fair in volume and the passenger traffic in some quarters unusually heavy.

In this connection it should be remembered that all of the streams in this part of the country have been navigable without interruption during the whole winter, so that much of the tonnage which is thrown on the railroads in a season when the water courses are blocked with ice or have insufficient water supply has been floated down on boats and barges to destination.

Manufacturers here seem fairly well employed and coal mining throughout the State is still being pushed. There has been a dearth of cars throughout the whole winter for the transportation of coal. The long period of extremely conservative buying and the gradual and healthy liquidation

of many unprofitable schemes must result before a great while in a natural reaction. In fact, it would not take much more of a demand than exists at present to make a lively scramble for goods.

Deliveries of both Barbed and Plain Wire have been hard to get in sufficient quantities since the first of the year.

The orders for Nails, both Wire and Cut, show a marked improvement in the last week.

It is hardly to be expected where plants are multiplied rapidly and producing machinery is increased in every quarter that the demand or consumption is bound to keep pace therewith, but the elements of prosperity are evident over the entire country, and unless extraordinary reverses enter in to disturb our calculations, there will be an exceptionally good business this coming summer.

While plowing and planting will be late, the crops will be all the safer for that, and the fruit prospects continue good.

Money is growing easier, so that all legitimate wants in that commodity will be readily supplied.

San Francisco.

HUNTINGTON - HOPKINS COMPANY.—Since our last report there has been a slight improvement in the sales. More particularly so in the country. We account for this from the fact that prospects for a large harvest of both fruit and grain were never better. This feeling has been still further augmented by a rain which has taken place with the last few days, and which has been quite general throughout the State. Farmers and fruit raisers now feel assured of bountiful crops. The impression prevails that prices for cereals and fruits will be fully up to if not in advance of prices of last year. Trade in the city still remains about the same. There has been no change of any note of prices of goods in our line. Collections still slow.

New Orleans.

A. BALDWIN & Co.—There is no change in the situation here, except that things are more quiet in our line since our last report. To add to the planters' miseries of too much water, they have lately had to contend with considerable frost, which has hurt the early vegetables and fruit. Trade in Texas is about on a par with our own section and is very quiet.

Cleveland.

THE W. BINGHAM COMPANY.—To talk about and complain of the weather has become so epidemic that we are beginning to think that to drop the subject altogether and pick up something new will have a salutary effect and bring about a better state of affairs. Suppose we go back to the McKinley bill; or, still better, take up the Mafia and the prospect of war with Italy—anything but the weather. The volume of business for the past two weeks has shown some improvement. Travelers

orders are not so much for staples as they were early in the season, and show a better general assortment that is encouraging. Wire is still in good demand; no change in prices. Nails are slow; \$1.70 for Cut, \$2.20 for Wire, from stock. All of the houses here are more or less crippled by la grippe, many of their employees being laid up with it. The boat owners here and at Buffalo have agreed not to commence running their boats until May 15. This will retard business at the different lake ports with people who are dependent upon this class of trade. Collections are but fair.

Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—There was nothing in the conditions prevailing during the past two weeks to especially stimulate the movement of goods, either in a retail or jobbing way. The delay in the arrival of steady warm weather is a hindrance to every branch of business. Still, taking all things into consideration, it must be admitted that the jobbing trade of this center are doing reasonably well. On account of the closeness of money for a few months past, and the lack of that buoyancy of feeling which plenty of money also engenders, a good many jobbers have been calling trade slow, but when they stop to figure up sales from January 1 to date they find that they have really sold more goods than they did during the same time last year. Just now farmers on the uplands are busy seeding, the ground being in admirable condition for this work. The low lands are too wet to work at present, and require a few days' sunshine and warm winds to put them in shape again. In an all round way the situation may be summed up as satisfactory, with the conditions strongly in favor of an increase in the volume of traffic as the spring season advances.

Portland, Ore.

FOSTER & ROBERTSON.—The volume of trade for the months of January, February and March of this year was much greater than for the same months of the year 1890, while April, up to the present time, gives indication of a very substantial gain over last year. So far as the local trade is concerned, Portland never had a brighter outlook. The amount of building contemplated, much of which is now under way, is the largest ever known in the history of the city. The prospect of the country outside of Portland, both east and west of the Cascades, is very flattering; in fact, could not well be better, and if the people will only let real estate speculation alone and give their attention to legitimate callings, we believe the year will prove to be a very prosperous one, in spite of the stringency in the money markets of the world.

Collections with us have been very good, in spite of the very general complaints on every hand, showing a substantial gain over the same period of last year.

The sharp competition among local wholesalers, coupled with the strong dis-

position of the trade to buy in the home market, has made it decidedly uncomfortable for the Eastern representatives on this territory this spring. Very naturally, in the strife for business prices have been cut more or less severely, but in an irregular way, so that we have no special changes to note.

Boston.

BIGELOW & DOWSE.—The weather is fine and trade is active. Orders are well assorted and cover the general line of Hardware. Poultry Netting and Barbed Wire are selling freely. Both Steel and Wire Nails are in good demand. Agricultural Tools, Lawn Mowers and Lawn Sprinklers meet with a ready sale. There is to be a large amount of building this season unless the mechanics prevent it by inaugurating strikes, as they have done in years past. The only indication of discontent at present is among the painters, who are on a strike.

The yield of maple sugar in New England this year is above the average, but the makers will get no royalty from the Government for this year's crop, as the law does not go into effect until July. But a small portion of the Sugar that has been made in the past would entitle the maker to receive the full bounty of 2 cents per pound, and this bounty will act as an incentive for them to improve the quality. A sample box received the past week from Bradford, Vt., showed the state of perfection required. This demonstrates what can be done, and next year there should be a marked improvement in the quality of the whole product.

Many complain of poor remittances, but money is easier and remittances are better than they have been.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The volume of trade during the last two weeks has improved somewhat in certain sections, but in other sections tributary to Philadelphia the improvement has not been equal to anticipations. During the first two weeks of April, in some sections, rain continued almost the entire time, and, indeed, until within the last few days there has been no relief; consequently trade has been materially interfered with, and roads have been impassable, all of which have caused a stagnation in trade in these locations, and it has had a very depressing effect upon customers. From one town a customer writes us as follows: "There is no such thing as collecting any money, and we don't think there has been a man in our town from the country during the last 60 days unless he came on the cars." Another customer writes as follows: "There appears to be no bottom to our ground, and teams cannot possibly pass over. It is a perfect sea of mud." Collections from the districts above named are naturally far below the average. In certain agricultural sections, which have not suffered from the above-named causes, trade has been fairly active, but the prospects for the next 30 days can only be estimated after a couple of weeks of good spring weather.

The trade in sections of the State where

the labor troubles exist have naturally suffered greatly through the long continued strike and trade there is at a standstill. The effects of the strike in the Iron region are shown by the reduced output of Iron for the month of March, the estimate of which is that there has been a reduction in the output of 3000 tons per day, although no scarcity of Iron exists. We think, however, this is from the causes named above, which to some extent have existed throughout the entire country. Prices, however, remain firm, and so far as we can learn there are no large stocks in the hands of manufacturers, which looks very much as if they had regulated their production according to their sales. With the above stated facts before one it would seem strange that there should be an increase of earnings by the various railroads. It all goes to show that merchandise could be moved at less rates than the railroads are now charging, and that they are hiding themselves behind a much mistaken Interstate railroad law. The movement in cotton has been somewhat greater than one year ago, but the movement in grain has decreased. The shipment of \$4,000,000 gold to Europe during the last week shows the selling of stocks held in this country rather than payments for importation of merchandise from foreign countries. Europe is anxious for gold and is bound to have it, either in return for goods sold to this country or in the sale of stocks they hold in this country. At the present writing a moderate amount of business is being done.

Notes on Prices.

Cut Nails.—During the past week the market has presented few new features, the demand continuing sluggish and the trade purchasing only to satisfy their early requirements. Prices are substantially the same as at our last review of the situation, and are on the basis of \$1.60 for carload lots at mill for the most approved brands, although this figure continues to be shaded in special cases. Some of the mills who have been desirous of effecting sales are pursuing a somewhat more conservative course. Quotations for small lots from store in New York are unchanged on the basis of \$1.75 for Iron and \$1.85 for Steel, with the usual concessions on desirable orders.

Chicago, by Telegraph.—Steel Cut Nails are in but little demand from manufacturers, who are trying to get slightly better prices. The Wheeling mill's especially are attempting to work up to \$1.65 at mill or \$1.80 here, on account of the stiffness in their raw material, but buyers are holding off. Local manufacturers quote \$1.75, Chicago, from factory. Jobbers ask \$1.85 in small lots, and 5 cents off for carloads.

Wire Nails.—The Wire Nail market is not at all strong and has receded slightly since our last report. The stocks of Nails in second hands appear to be sufficient for present requirements, not being yet exhausted, owing to the sluggishness in trade. We are, however, advised that some good orders have recently been placed. Quotations are on the basis of

\$2.10, f.o.b. at mill, for round lots, but concessions are made on specially desirable orders. Small lots from store are held at \$2.30 to \$2.35, with 5 cents off for carloads.

Chicago, by Telegraph.—In Wire Nails there is a little more disposition on the part of manufacturers to urge business, but the trade is still well supplied and will not need additional stock until consumption is more active. At recent quotations Wire Nails can be laid down in Chicago at \$2.12½ in large lots from factory. Jobbers quote \$2.30 in small lots, with 5 cents off for carloads, but the tendency is downward.

Barb Wire.—The market continues in substantially the same condition as at our last review. Some of the manufacturers report business in very satisfactory volume. The stocks in the hands of jobbers are unquestionably large, and some complaint is made that the Wire can be procured at lower prices from the jobbers than the manufacturers. Prices are on the basis of \$3.50 for Four-Point Galvanized and \$2.95 for Painted, with the regular abatement of 10 cents for carload lots and 5 cents for jobbers and railroads; terms 60 days, or 2 per cent. discount for cash in ten days, with delivery at leading points.

Chicago, by Telegraph.—Very little movement is reported at present, but quotations continue as before.

Ammunition.—There has been no important change in the aspect of the Ammunition market, and the impression prevails that the associated manufacturers have not yet matured their new plans for the marketing of the goods. In the meantime matters appear to be progressing regularly. Under date April 8, a circular has been issued by the manufacturers in which they refer to the fact that an impression appears to prevail that a reduction in price is contemplated, and state that while they are unable at present to anticipate their future action as to prices, for the protection of their customers they will guarantee until further notice each shipment of Ammunition purchased from any of them against a reduction in price which they may make for a period of 60 days from the date of each invoice. This announcement is made in a joint circular signed by:

UNION METALLIC CARTRIDGE COMPANY,
HARTLEY & GRAHAM.
WINCHESTER REPEATING ARMS COMPANY,
UNITED STATES CARTRIDGE COMPANY,
WALLACE & SONS.
AMERICAN METALLIC CARTRIDGE COMPANY,
MERWIN, HULBERT & CO.

Sheet Lead, Lead Pipe, &c.—Bailey, Farrell & Co., Pittsburgh, Pa., under date April 11 announce the following revised prices, which are subject to a discount to the trade of 10 and 5 per cent.

Lead Pipe, per pound.....5½ cents.
Sheet Lead, per pound.....6
This decline in the price is owing to the condition of the Pig-Lead market.

Binder Twine.—The market for Binder Twine continues without any very important change, with a fair demand. Prices are in general pretty well maintained. The condition of the market in the West is in-

dicated in the following quotations for carload lots and less than carload lots, terms 30 days net, subject to a discount of 1½ per cent. for cash in ten days:

Carload Lots.	
Sisal.....	8½ cents.
Standard.....	10 " "
Standard, Mixed.....	10½ " "
Pure Manila.....	12½ " "

Less than Carload Lots.	
Sisal.....	8½ cents.
Standard.....	10½ " "
Standard, mixed.....	11 " "
Pure Manila.....	12½ " "

The following are the New York prices for Binder Twine in carload lots:

	Per pound.
Sisal.....	8 cents.
Manila.....	12 " "
New Zealand.....	7½ " "
Jute.....	6½ " "

Hardware Specialties.—E. H. Wayne, 422 Commerce street, Philadelphia, has issued a price-list of specialties put on the market by him. It includes the following goods:

Locks.	
Jail Pad, Secure Shackles (2 Keys each).	
No.	Per doz.
119.....	\$0.60
120.....	.70
130.....	.80
140.....	.90

Trunk Locks (4 inch).	
Japanned.....	\$1.00
Tinned.....	1.25
Brass.....	2.50
Rim, 4-inch, complete with knobs.....	1.65
Sewing Machine.....	.25

Latches.	
No.	Per doz.
100A, 2 tinned Keys.....	\$1.20
80, 2 polished ".....	3.75
100, 2 flat steel ".....	6.00

Keys and Blanks.	
Tinned Cut Keys, per dozen.....	\$0.10
Cut Cabinet " per gross.....	2.00
" Till " ".....	1.90
" Chest " ".....	2.00
" Trunk " ".....	1.90
" Bag " ".....	1.65
Tinned Blank " per dozen.....	.10
Flat Steel Blank Keys, per dozen.....	.15
" " Trunk " ".....	.15
Cabinet Blank " " assorted.....	.25

Electrical Goods.	
Batteries complete, per cell.....	\$0.60
Wood Box Bells (2½ inch), each.....	.65
" " (3 inch), ".....	.70
Insulated Wire, per pound.....	.30
Wood Push Buttons, each.....	.08
Bronze " ".....	.60
Switches, each.....	.20
Door springs, each.....	.15

Spoons.	
Steel Tea, Malacca Plate Tipped, per gross.....	\$2.25
Steel Table, Malacca Plate Tipped, per gross.....	4.50
Silver Metal Tea, per dozen.....	1.00
" " Table, ".....	2.00

Shears.	
Victor, Japanned Handle, 7-inch.....	\$0.40
" " " 8-inch.....	.50
" " " 9-inch.....	.60
Clipper Plated, 7-inch.....	.95
" " 8-inch.....	1.10
" " 9-inch.....	1.25

Trowels.	
Handy Brick, 8-inch.....	\$2.00
" " 9½ ".....	2.00
" Pointing.....	1.00
" Plastering, 10-inch.....	2.00

Sundries.	
Cedar Lead Pencils, per dozen.....	\$0.08
Tempered Steel for Lock Springs, per ounce.....	.05
Key Rings, per dozen.....	.10
Speaking Tube Whistles, Japanned, per dozen.....	1.50

Speaking Tube Whistles, Plated, per dozen.....	2.25
Patent Store Door Alarms, Bronzed, per dozen.....	3.00
Patent Store Door Alarms, Polished, per dozen.....	4.50
Key Chains.....	.60
" " Plated, per dozen.....	1.25
Warding Files, 3-inch, per dozen.....	.80
" " 4-inch, ".....	.85
" " 5-inch, ".....	.90
" " 6-inch, ".....	1.00
Grindstones, per pounds.....	.01
Tool Steel, Octagon, per pound.....	.08
Scythe Stones, Darby Creek, per dozen.....	.60
" " Manchester, ".....	.40

Glass.—The Glass market shows some features of encouragement, especially in the direction of firmer prices. It is reported that Western Glass makers have withdrawn quotations to quite a large extent, but are making prices for good assortments, in car lots, at 80 and 20 per cent. discount on single and 85 per cent. discount on double. The price quoted on small lots in New York is 80 and 10 per cent. discount. Jobbers are discriminating in favor of cash buyers, preferring to hold their Glass rather than to extend credit to those who are apt to ask extensions on their bills. James A. Chambers, president of the American Window Glass Company, was in New York a few days since, and it is reported that his business was connected with the starting up of the concern. It is understood a meeting of the American Window Glass Company was to have been held in Chicago on the 15th inst. looking to the same result.

An advance in price of Glass is expected if the reorganization is effected. The stocks of the smaller factories are getting into stronger hands, and it is reported that if the larger factories that have been running regularly intend to run until July they will be obliged to increase their warehouse capacity. Jobbers have enough Glass ordered or in stock to supply the early spring trade, which was bought at low prices. There is no difficulty in getting orders filled promptly at the factories, which indicates full stocks in the manufacturers' hands. Plate Glass is reported rather dull at the present time, with indications of a good business in the near future. Chambers & McKee Glass Company, Jeannette, Pa., are building an addition to their Glass works, for the manufacture of Chipped, Ground, Enameled and Embossed Glass, in plain and colored, for decorating purposes in churches and buildings where Fancy Glass is used.

Trade Items.

TUCKER & DORSEY MFG. COMPANY, Indianapolis, Ind., state that they have sold nearly 1000 of their Improved Factory and Wareroom Trucks since the first of the year, and that users of these Trucks almost universally express themselves as satisfied with them. There seems to be a regular reform movement in regard to the use of Trucks, which the above firm have doubtless done much to bring about. They are now getting out a Truck that will be specially adapted for the use of Hardware stores, which is referred to as being particularly meritorious.

THE HOLMES & EDWARDS SILVER COMPANY, Bridgeport, Conn., are calling the special attention of the Hardware trade at present to their line of German Silver Spoons and Forks. They guarantee this line of goods to be uniform in quality and

of superior finish. An interesting series of leaflets is issued by them in which they effectively direct the attention of the trade to some of their patterns, among which their Orange Spoons may be particularly mentioned.

CARL F. BOKER makes formal announcement of the fact that he has entered the firm of Hermann Boker & Co., 101 and 103 Duane street, New York, as a partner, and that his business as importer of Steel has been consolidated therewith, and removed from 104 and 106 John street to the above address. Hermann Boker & Co. in an appended circular call attention to their large stock of foreign and domestic Hardware, Cutlery, Guns, &c.

HARMON & DIXON, 118 Chambers street, New York, have been appointed agents by the National Screw and Tap Company, Cleveland, Ohio. They will carry a full line of the company's manufactures in stock.

S. D. KIMBARK, the well-known Heavy Hardware merchant, whose extensive warehouse and offices are located at Lake street and Michigan avenue, Chicago, has recently completed a large factory at Elkhart, Ind., for the manufacture of high-grade Buggy, Carriage and Wagon Bodies, Oak and Hickory Spokes and Bent Work. Mr. Kimbark operated a similar establishment for many years at Quincy, Mich., but removed to Elkhart to secure greater facilities. The main building, which is L-shaped, is a two-story structure, with a total frontage of 400 feet and a depth of 80 feet, used for body-making and spoke work. Another building, one-story high, also L-shaped, is 188 feet long in all and 40 feet deep, and is used as an engine and boiler house and bending room. The tracks of the Lake Shore and Michigan Southern and the Cincinnati, Wabash and Michigan railroads run on two sides of the buildings, affording excellent transportation facilities and avoiding expense in receiving material or shipping goods. Elkhart is located in the Indiana hardwood section, so that the material to be worked up in the factory is brought but a short distance, while Chicago rates of freight obtain to most Western towns. The latest improved machinery has been placed in this factory, so that it is not simply Mr. Kimbark's old plant at Quincy, Mich., removed to a new location. It is expected that from 100 to 200 bodies will be burned out daily.

THE HEATH & MILLIGAN MFG. COMPANY, 170 to 174 Randolph street, Chicago, manufacturers of Mixed Paints, Dry Colors, &c., have just issued a very handsome catalogue entitled "Practical Hints on Decoration." While the object of this work is primarily to set forth the distinctive merits of the company's products, an effort is made at the same time to present facts and suggestions of sufficient value to builders and others to make the book worthy of preservation for reference. The company having had 35 years' experience in the manufacture of Paint, they are obviously well fitted to give practical and valuable advice on the use of Paints. The catalogue opens with a readable dissertation on Paint, in several chapters, with appropriate headings. The subjects of "Outside Painting" and "Inside Painting" receive separate treatment. Then follow 12 pages of colored plates, showing various combinations of colors in painting the 'outsides of houses. The houses selected for this presentation are of modern type and well calculated to show the improvement that can be effected in their outward appearance by the use of tasteful colors. A chapter then follows on colors and their combinations, with which is incorporated a poem on the subject by Henry Hopkins White, the whole being very readable and instructive to

those not familiar with the rules for mixing pigments. A page is devoted to specimens of the company's colors, no less than 60 different shades being shown. The last 20 pages are devoted to a list of the Paints, Colors, Oils, Varnishes, &c., made and sold by the company. A general price-list is published in a separate pamphlet of 50 pages, covering a complete line of Paints and related goods.

E. C. STEARNS & Co., Syracuse, N. Y., call our attention to the fact that the use of Window and Door Screen Frames as a sanitary precaution is a point which has never been particularly enlarged upon, although it is a feature which should receive careful consideration by the public at large. In addition to their utility not only in private residences, officers' army quarters, &c., it is pointed out that they are especially necessary in hospitals, quarantine buildings, and in short, all places where the sick or injured are confined. They point out that the recovery of a patient will be much more rapid if he is not obliged to expend his strength and vitality in a vain combat with flies, mosquitoes and other pests of the insect world. As an enforcement of this statement they send us copies of letters addressed to F. Codman Ford, who handles their goods in New Orleans, stating that wire frame nettings put into the openings of all the quarantine buildings at each of the stations of the State of Louisiana have given great satisfaction, as the dwellings, stores, &c. have thus been rendered much more comfortable. Another letter also refers to the desirability of Wire Screens in all doors and windows in army quarters.

BINDLEY HARDWARE COMPANY, Pittsburgh, Pa., are sending out an 1891 spring and summer illustrated catalogue of 50 pages. A perspective view of their new building, which is an imposing structure, is given on the front page of the cover. In reference to this building, which was erected by themselves, they state that it is especially adapted to the requirements of their business, and is conceded to be the most complete of its kind in the United States, giving them the greatest facilities for the proper transaction of business. The catalogue is well printed on a good quality of paper, with price-lists and descriptions of the goods shown.

WE ARE ADVISED that owing to the death of Moses Seward, senior member of the firm of M. Seward & Son, New Haven, Conn., which occurred at his home in that city on March 13 last, the firm was dissolved on March 31, and was succeeded on April 1 by the M. Seward & Son Company, a joint-stock corporation organized under the statute laws of the State of Connecticut. The new company will continue in the same line as the old firm, and with largely increased facilities propose to adhere to their established policy of making first-quality goods. The executive officers of the corporation are Frank Seward, president; Geo. E. Hodson, treasurer, and C. E. Prince, secretary.

THE TREASURY DEPARTMENT has notified an importer that a trade-mark will not be accepted as a sufficient indication of the country of origin of an article unless the trade-mark includes the name of the country, as required by the McKinley act, in which case it will be accepted as a sufficient compliance with the law.

KELLY, MAUS & Co., 184 Lake street, Chicago, have been pushing the Heavy Hardware business so vigorously within the past few years that they are now compelled to greatly increase their facilities for handling merchandise in their line. Last week they laid the foundation of a new six-story warehouse on West Water street, between Washington and Randolph streets. The building occupies a ground

space about 160 by 80 feet wide. It will be six stories high, composed of steel frame work with heavy brick walls. The first floor will be fitted to hold 10,000 tons of Iron and Steel, but the architect says that its real capacity will probably be 20,000. The firm expect to carry the largest stock in their line in the United States upon the completion of this warehouse.

THE STANLEY RULE AND LEVEL COMPANY report sales of over 20,000 Roofing Brackets already; and that the use of these novel devices in shingling, painting or repairing roofs seems likely to become quite general.

Nail Averages.

G. G. SPENCER, agent of the Laughlin Nail Company, 556 Rookery, Chicago, issues a circular explaining what is meant by averages on Nails. Relating as it does to a matter which is not entirely clear to some Hardwaremen, we take pleasure in reproducing the substance of the circular:

We frequently receive letters asking "What do you mean by an average?" and for your guidance permit us to hand you specifications received from one of our customers, which we have averaged, and which explains itself.

	Extra above base at	Per keg equals
4 kegs 60d Nails.....	\$....	\$.....
5 " 40d "	0.05	0.25
5 " 30d " .....	.10	.50
20 " 20d " .....	.15	3.00
70 " 10d " .....	.20	14.00
80 " 8d " .....	.25	20.00
25 " 6d " .....	.40	10.00
20 " 5d " .....	.60	12.00
15 " 4d " .....	.60	9.00
10 " 3d "	1.00	10.00
15 " 3 inch fine.....	1.50	22.50
10 " 8 " casing.....	.75	7.50
8 " 2½ inch clinch..	1.00	8.00
4 " 2 " finish.....	1.15	4.60
7 " 2½ " "	1.00	7.00
2 " 3 " " .....	.85	1.70
300 kegs.		\$130.05

Kegs—Extras.	
300, \$130.05	0.43 35-100 cents average
120.0	
10.05	
9.00	
1.050	
.900	
.1500	
.1500	

If you will take your specifications and do likewise you will find that you can give us a high average, which would entitle you to a low price. Please try it.

Electrical Goods to Carry in Stock.

(Continued.)

WE ARE INDEBTED to Frederick Pearce, 77-79 John street, New York, for the following assortment of electrical goods, with net prices, which are suggested by him as desirable for a Hardware merchant to put in stock when starting in this line of business:

Iron Box Bells, 2½ inch.....	\$0.50 each.
" " 3 " .....	.55 "
" " 4 " .....	.60 "
Wood " 3 " .....	.90 "
" " 4 "	1.00 "
No 8. Annunciator Wire.....	.25 per pound.
(On 1-pound spools, of 155 feet to the spool, four different colors.)	
No. 16, Patent Office Wire, for cellars and damp places..	.30 per pound.
Walnut Cleats, 2 inch.....	.75 " 100.
Porcelain Knobs, 1 inch, for insulators.....	.95 " "
Circuit-Closing Attachment, for front doors.....	1.20 each.
Leclanche Battery, complete.	.50 "

Battery Salts.....	.04 per package
" Boxes, 2 cell.....	.50 each.
" " 4 ".....	.65 "
Tape, in rolls.....	.25 per roll.
Push Buttons, ash and cak...	.07 each.
" " rosewood and black walnut.....	.12 "
Side-cutting Pliers, 6-inch stubbs preferred.....	.75 "
Gimlet Bits, 1/4 inch, 24 inches long.....	.40 "
Gimlet Bits, 1/4 inch, 36 inches long.....	.42 "
Staples, in packages.....	.08 per package
Flexible Pear-Shaped Pushes	.40 each.
Dining Room Floor Attachments.....	.45 " set.
Flexible Cord, double conductor.....	.15 " yard.
No. 12 Hard-Drawn Copper Wire.....	Market price.
Pony Magnetos.....	4.00 each.

Magnetos are used on telephone lines where it is impracticable to use Batteries. The "Bell Hangers' Hand Book" is recommended by the above firm as desirable for all to have who handle electrical goods, as giving just the information required in a complete and condensed form. This book contains 97 illustrations; price, 75 cents. The following information, which accompanies this list of goods, will be of interest:

There is an erroneous idea that Battery Salts are injurious to other goods when kept in stock in packages. Such is not the case. Although the name given to Battery Salts—Muriate of Ammonia—sounds chemically mischievous, it is as harmless as sand in the state in which it is kept or handled. It does not absorb moisture from the air; neither does it deteriorate with age or evolve any gases. It leaves the most susceptible article in a Hardware stock free from any possible injury by chemical action, even when in close proximity to it.

With reference to this as a line of goods to be handled by Hardwaremen, Mr. Pearce remarks:

Although the Hardware trade have handled Electric Bells in a very conservative manner, there is sufficient evidence that it is a very satisfactory line and no longer an experiment.

The great question to solve is, What constitutes a full line of Electric Bell supplies for the Hardware trade? The time is not far distant when it will become second nature for a customer to expect to receive electric supplies from stock over the Hardware counter.

The requirements for electrical uses have led to a multiplication in styles of Wires, and of different coverings or insulations on Wires, for special uses. The Ansonia Brass and Copper Company, 19-21 Cliff street, New York, and 133-135 Wabash avenue, Chicago, who manufacture Pure Electric Copper Wire, advise us that while it would not be desirable for a retail Hardware merchant to carry a full line of these goods, they recommend a judicious selection of the kinds used for house and office work to be kept in limited quantities. For this purpose the following list of Wires is given:

- A. B. C. Weather-Proof Wire.
- Bell or Annunciator Wire.
- Office Wire.
- Flexible Cords.
- Fuse Wire.

Their A.B.C. Weather Proof Wire is made with either a double braid or triple braid, as desired, and is claimed to be absolutely moisture proof, and to be adapted to all the varying conditions of house or line work. It is suggested that the desirable sizes to be carried in stock, and which are

used for inside wiring for incandescent lighting, are numbers 10, 12, 14, 16 and 18. Bell or Annunciator Wire on spools is made from No. 12 to 22 gauge. This Wire is furnished double wound in any color or variety of colors. It is stated that the cotton is tightly wound and adheres firmly to the Wire; that the colors are bright and durable, and the Wire is finished with a high polish. They make to order Annunciator Cables with any number of strands, each strand of a separate color to facilitate tracing. It is stated that these Cables are run as easily as single Wire and occupy much less space. They also prepare these Wires for connecting and Leading Wires for blasting purposes. Their Office Wire is furnished either braided or wound and braided in any variety of colors, in coils, from No. 12 to 22 gauge. Flexible Cords, for incandescent lighting, with double conductors, are made with silk, cotton and worsted coverings. The insulation of this Cord is a winding of rubber well secured. The Wires are not laid straight to the core, but are twisted together, to give increased flexibility. These Cords are furnished in any desired color or combination of colors. Fuse Wire is designed to automatically open circuits when the current becomes greater than intended, and, therefore, dangerous. In other words, the Fuse Wire is joined at both ends to the Copper Wire, and fuses or melts at a desired degree of temperature. A table is given in connection with a price-list, showing dimensions, capacity, &c., of these Wires. It is stated that this table is based upon actual practical tests, as well as upon theoretical calculations, and may be relied upon.

It is remarked that in some cases it might be desirable to carry Commutator Brush Copper, which comes in rolls of about 10 pounds each. In ordering Brush Copper it would be well to ascertain the width, thickness, &c., used on the local dynamos and motors, with a view of supplying this demand. As Wires which dealers might supply on special orders, Fire-Proof and Weather-Proof Line Wire, triple braid, Fire-Proof Electric Light Line Wire and Railway Feeder and Trolley Wires are named. Prices are not given with this list of Wire, owing to the large number of gauges made and to the variety and thickness of coverings.

Whatcom, Wash.

WE ARE in receipt of the following advices from W. J. Pratt Hardware Company, Whatcom, Wash. Referring as they do to a market of rapidly increasing importance, our correspondents' views will be of interest to the trade:

It might be of interest to a few of your numerous readers to hear something from the far-famed Bellingham Bay country. To one who has never visited this section of the country the wonderful growth of this city in the last 18 months would seem like a fairy tale, but we will endeavor to show you that it is a reality. All branches of business have been remarkably good the past season; and in no branch of business have the conditions been more favorable than in the Hardware trade. We

enjoy the distinction of being the only jobbers on Bellingham Bay, and rank among the largest on Puget Sound. This city of 15,000 inhabitants has six retail stocks, and all report a large increase over last year's business. There appears to be bright prospects for the trade this coming year, as there are hundreds of residences, besides a large number of business houses, in course of erection, and as many more contemplated. The agricultural trade is naturally greatly increasing, owing to the rapid development of the country. The stringency of the money market in the East naturally affects a city of this size and yet we can find no fault with collections. While in some cases collections have been slow, the percentage of loss has been far below the ordinary. Traveling men report an increase of trade all over the Sound country, and in no place are their impressions more favorable than for the Bay. One of the principal drawbacks we have to contend with is the exorbitant freight rates, which compel us to make our shipments from all Eastern points by boat around the Horn. Owing to the fact that our place of business is built upon piling over the Tide Flats, our insurance so high and our risk so great, we deem it advisable to change our location, and in consequence we have in course of construction a store building 50 x 110 feet, two stories high, in which will be placed the retail department. We have also two commodious corrugated-iron warehouses, one situated near the store and one at the railroad and steamboat dock. When completed we will have one of the most commodious, complete and handily equipped Hardware establishments on Puget Sound.

The Retailers' Association.

THE MEETING of those interested in protection for retail dealers, appointed for the evening of April 9, was adjourned to April 23, and will be held at Military Hall, 193 Bowery, New York. Notices of the adjournment have been sent to those who have indorsed the movement and to others who are interested in the matter. The work before the adjourned meeting will be to decide upon a name for the association, prepare by-laws and to register membership. A number of communications have been received by the president of this association from retail Hardware and Stove dealers in New York and vicinity, who express themselves in sympathy with the movement, and make the point that organization is necessary for their protection.

It Is Reported—

That W. C. Quintard, Hardware, Guns and Agricultural Implements, South Norwalk, Conn., has sold out his business to H. B. Coby.

That Pope & Coe, Hardware, &c., Elkhart, Ind., have dissolved, the latter's interest having been purchased by E. A. Jones.

That Sahler, Reynolds & Webster, Hardware, Kingston, N. Y., have disposed of their business to W. D. McMillan and S. D. Coykendall.

That J. M. Naylor's Hardware store at Tiffin, Ohio, was considerably damaged by fire on the 2d inst.

That Milton Labaw, Hardware dealer at Somerville, N. J., having secured the store adjoining the one now occupied by him will connect the two, thereby enabling him to better meet the demands of his increasing business.

Cycles.

IN ADDITION to the information given in former issues in regard to the Bicycles, Safeties, &c., put on the market by the different manufacturers, we give below advices in regard to the machines of Banker & Campbell Company and Premier Cycle Company.

BANKER & CAMPBELL COMPANY, 12 Murray street, New York, in addition to manufacturing the Meteor Cycles, an illustration of which was given in our issue of April 2, are agents for the following Safeties:

Dauntless.

Mohawk.

Monitor.

Guide.

The Dauntless has a convertible drop frame, ball bearings to wheels, crank axles and pedals, drop-forged head, forged steel chain, steel tubing, tangent spokes, rubber tires and dress guard over the chain. These Wheels are made in four sizes, from 24 to 30 inches. The Mohawk is made with convertible drop frame, steel tubing, nicked detachable hollow stay rod, ball bearings to wheels, crank axles and pedals, ball socket head, tangent spokes, dress guard over wheels and chain, Garford or Fish Saddle, &c. These are made in three sizes, from 26 to 30 inches, with solid or cushion tires. The Monitor has ball bearings to wheels, crank axles and pedals, drop-forged head, forged steel chain, tangent spokes, cross frame with nicked truss rod, Garford or Fish Saddle. These are made from 24 to 30 inch, in four sizes. The Guide is made only in one size, with 30-inch wheels, direct spokes, ball bearings to wheels and pedals, adjustable cone bearings to crank axle, crescent rims, gray rubber tires, handle bars and saddle adjustable to any height. The four machines named are all medium in price.

PREMIER CYCLE COMPANY, 846 Eighth avenue, New York, and Orange, N. J., will have on the market for the coming season:

Catford Premier Safety.

Catford Premier Safety, Semi-Racer.

Koh-i-noor Premier Safety.

Ladies' Premier Safety.

Popular Premier Safety.

Universal Premier Safety.

Youths' Premier Safety.

Boys' Best Safety.

Boys' Own Safety.

Premier Tandem Safety.

These Wheels are made with tires as follows: Catford, pneumatic, cushion and solid; Catford Semi-Racer, cushion; Koh-i-noor, cushion; Ladies', cushion and solid; Popular, endless molded; Universal, pneumatic, cushion and solid; Youths', solid; Boy's Best, solid; Boy's Own, solid; Tandem, cushion and solid. Their line of Premiers consists of 16 distinct patterns, embracing wheels for all ages, both sexes, and fitted with solid, cushion and pneumatic tires. The manufacturers guarantee the tires of cushioned Premier Safeties to be more durable than solid tires, and they back this guarantee with an offer to replace free of charge, within one year, all defective cushion tires supplied by them. Their pneumatic tires are made and placed on the wheels by the Pneumatic Tire Company, being the Dunlap Pneumatic Tires. The manufacturers claim that all Cycles of their manufacture are built strictly to gauge, and are absolutely interchangeable without fitting.

Wallace & Sons' New Catalogue.

AN ESPECIALLY HANDSOME and artistic catalogue relating to manufactured Brass and Copper is being placed in the hands of the trade by Wallace & Sons, 29 Chambers street, New York, and Ansonia, Conn. The work is tastefully bound in black and red cloth, and contains something over 100 pages. It is apparently the most complete catalogue covering this line of goods that has yet been published. The illustrations are noticeable features, views being given of their extensive mills at Ansonia, Conn., of the interior of their offices, salesroom, shipping department, &c., in their New York warehouse, also of their office building at Ansonia, together with interior views of their mills and shops. These illustrations are scattered throughout the catalogue, and being admirably executed, add largely to the interest and attractiveness of the volume. Direct telephone communication is had between their New York offices and Ansonia mills, which greatly facilitates business. Comprehensive rules are given to be observed in ordering Sheet Brass, Sheet Copper, Tubing and Wire, to avoid the necessity of writing for further information before shipping orders.

It is stated that particular attention is given to manufacturing hard-drawn Copper Wire, for use as trolley Wire, long distance telephone and telegraph lines; and also to the manufacture of Wire generally. A list of a large variety of sizes of soft Sheet Copper is given, also the sizes of Sheet and Bolt Copper to be found in stock. Cold-Rolled Patent Leveled Cornice Copper, 14, 16, 18 and 20 ounce, is carried in stock, and other sizes and weights made to order. Copper Rivets and Burs are noticed as a special line; also Seamless Brass and Copper Tubing; stock sizes being in 12-foot lengths, from $\frac{1}{4}$ inch to 6 inches in diameter. A large line of Lamps and Lamp goods is also represented; as well as the United States Cartridge Company's Ammunition, for which they are agents and of which they carry a full stock, a large storage vault being used for these goods. The illustrations, which are numerous, and the typographical work are excellent; and a fine quality of paper has been used. The catalogue, as a whole, is also carefully compiled and cannot fail to be of service to those interested in the extensive line to which it relates.

Price-Lists. Circulars, &c.

HERCULES NOVELTY MFG. COMPANY, Albany, N. Y.: Folding Extension Horse, Sectional Ladder, Mason's Hawks and Floats. The Folding Extension Horse is for the use of architects, masons, builders, paper hangers, painters and decorators, machinists, boiler makers, steam and gas fitters, iron bridge builders and for construction purposes generally. It is claimed that with their 15-foot horse ceilings can be worked at a range of from 15 to 21 feet high, yet this sized Horse will go through a 2-foot door; and that it is adjustable to a fractional part of an inch.

G. W. HILDRETH & CO., Lockport, N. Y.: Garden Clipper Weeder, Champion Cultivator, Cultivator and Bean Harvester, Contractors' Plow, Contractors' Steel Scraper and Roache's Metallic Steam-Pipe-Joint for rotary, paper drying and revolving cylinders.

THE TOM THUMB MACHINE COMPANY, Dublin, Ind.: Tom Thumb Fence Machines. These are made in the Improved Tom Thumb Senior No. 1, Tom Thumb Senior No. 2, Farmers' Alliance Tom Thumb, Tom Thumb Junior and Parrish Tom Thumb, also the Mosley Fence Brace. It is claimed that the Tom Thumb carries the picket in a desirable manner, that the top

of the pickets can be gauged, that the machine can be changed to keep the pickets perpendicular in going up or down hill, that it makes a uniform twist, that the machine can be taken off or put on the wires at any time and that any number of wires can be used.

SNELL MFG. COMPANY, 72 Reade street, New York, and Fiskdale, Mass.: Ship Augers, Auger Bits, Boring Machines and Boring Implements. Their catalogue, recently issued, contains illustrations and lists of their goods, nicely printed on good quality of paper. The comprehensive arrangement of the lists throughout and the neat appearance of the catalogue are noticeable features.

GRAND RAPIDS WHEELBARROW COMPANY, Grand Rapids, Mich.: Catalogue of Railroad, Miners', Canal and Garden Barrows, with Steel, Iron and Wood Wheels. This catalogue, although of the pocket variety, illustrates and describes a very complete line of Wheelbarrows. The steel wheel used is the company's own patent, of the velocipede pattern, and is manufactured expressly for them. The wood wheel is strongly tired on a special machine and has chilled cast-iron skeins in each end of the hub. Their iron wheel is made with wrought-iron spokes, well spread or dodged in the hub. It has a ring of wrought iron, around which the cast-iron part of the tire is run, so that if the cast-iron part were to break the wheel would still be serviceable. Cuts are given showing the Unicycle, the Gem, the Star, the Roland and the Jewel; also Ore and Mortar Barrows, Stone Barrows, Pig Iron or Wood Barrows, Brick Barrows and knock-down shapes for shipment.

Paper Letters and Figures.

THE TABLET AND TICKET COMPANY, 87-89 Franklin street, New York, and 99 Franklin street, Chicago, manufacture Gummed Letters and Figures. Convenient use can be made of them by Hardwaremen for labeling boxes, drawers in stores, letter-file numbering, show-card lettering, glass signs, price marks, window and showcase lettering, announcing special sales on store show windows, &c. Referring to their use in their catalogue, the manufacturers state that their appearance on windows for a few days at a time is a very effective way of bringing customers into a store. In order to reap their full benefit, they should be washed off after a few days and renewed again. It is claimed that the great advantage is that while they look almost as well as porcelain letters, they cost a mere trifle, and can be renewed with so little expense as to be not worth considering. These are made in 24 sizes, in white, black and red.

"My Waste Basket" Again.

THE CONTRIBUTION entitled "My Waste Basket," which appeared in our issue April 2, has called out from the trade several letters. In the one given below the writer, a well-known and experienced Hardwareman, continues the discussion of the question, and in a happy vein refers to the wisdom of enterprise in the sending out of printed matter, while he also alludes to the opportunities which are thus brought within the reach of the trade.

In a recent number M. I. Shadow, in his "My Waste Basket," says: "And I could not help thinking that the manufacturers who sent out the circulars took about as much pleasure in wasting their printed matter as Philip does in wasting his time." We renounce any special purpose to insinuate or moralize. We would rather that a recital of our observations arouse a proper appreciation of the good intentions

of those that in the various ways call attention to their wares. There is a reward inherent in industry; there is a reward inherent in the effort to educate and discipline the mind, and there is a reward inherent in advertising. This inherent benefit in advertising is co-beneficial—to the people sending the circular with the people receiving it.

Sending out circulars, lists, illustrations and various forms of printed matter calling attention to the product of the factory and the merchandise of the store is seed sown, and, like that in the parable, does not all fall on the same kind of ground. Men in all lines of education throw away the precepts, the texts, the fundamental basis for an education. To advertise is to educate commercially in a given line. They discard the circular or advertisement because of indifference and lack of capacity to absorb. Lack of time or interest in the article to which it is desired to call attention is not always a valid reason for lack of courtesy to the sender or a practice just to the receiver of the circular. There are elementary ideas in all modern advertising, exclusive of the special line to which attention is called, and he who can not discover these ideas for adaptation to his interests and the furthering of his business has not that keen discrimination characteristic of men with good business methods. Therefore it pays to give reasonable time and attention to all circulars that come, and eschew the seeming disdain for the circular that the unopened envelope found in waste baskets indicates.

The boy Philip was looking for a lottery circular, he was interested in the game of chance. Many and numerous are the circulars that go into waste baskets such as Philip was going through that offer chances that are a grand prize for all, and that all can legitimately draw. In the light of the fact that I have the acquaintance of a young man who indulged his inquisitiveness as Philip did, and thereby learned and now holds a place of responsibility. I am inclined to believe Philip will, and others can if they so desire, study the lottery circulars, and see to it that they draw good prizes.

A Buffalo correspondent, after referring to the interest with which he read the article in question, writes as follows:

I am also overrun with numerous price-lists and circulars, and a great many of them find their way into my waste basket. Many of these are more or less valuable, but as yet I have discovered no way of keeping them. I would like, through the medium of *The Iron Age*, to hear of some way in which these may be filed, so as to be easily obtainable when wanted. The difficulty arises as to whether they should be filed under the name of the firm, which is often forgotten, or under the article, of which several different kinds are often found in the same catalogue. Any light thrown upon this subject will be esteemed a great favor.

We have already given descriptions of various plans for indexing and filing price lists, but perhaps our readers can offer suggestions in reply to the inquiry of our correspondent.

Giving Credit.

A PART FROM the actual loss of accounts which are carried on the books, the successful merchant is subjected to constant annoyance and vexation in determining questions as to the giving or withholding of credit. Some of the problems which are thus forced upon him are referred to in the following communi-

cation, which comes to us from a large and successful house in the Northwest. We will be glad if our readers can give any light upon the problems presented by our correspondent:

Having charge of the collections and credits of a large retail Hardware store, I have been quite interested in the communications on the subject which have appeared in your columns during the last few weeks. Would have been glad to have heard from more of your subscribers.

This is a subject which is of vital interest to all of us. The result of a number of years' experience leads me to draw the line closer and closer each year. However, to my mind it is a harder problem to decide when to continue to trust a customer than it is to trust him in the first place.

Here is a man who has been buying of you for some time past, and has always paid his bill promptly. He comes in and says he cannot pay for a short time. Shall you give him the extra time he asks for?

Now, we have had cases where we have carried customers over a tight place and they have appreciated it, and have expressed their appreciation by continuing to trade with us. Again, we have granted extensions to other customers who have only used the extra time to beat us. We have lost our customer and our money both.

Another variation of this same problem is this:

Here is a customer who has traded with you for a number of months past, buying and paying, buying and paying. You begin to hear of his being sued by some one—a lien is put on his building by some one else, and, perhaps, after a while some one obtains a judgment against him—all this time he is paying you. Now, what is one to do? To shut down on him or to continue to trust him as long as he pays?

I, for one, would be only too glad to hear from some of your subscribers on these points. Perhaps they have been discussed of old, but no matter—they are ever new.

GRINDSTONE.

The Tin-Plate Situation.

THE FOLLOWING editorial remarks upon the tin-plate trade are taken from the *London Ironmonger*, 4th inst. It will be observed that reference is made especially to the American demand as affected by the tariff, and that it is pointed out that it is probably the part of wisdom for the English manufacturers to seek new markets:

The present condition of the tin-plate trade is curious and characterized by many features which are anomalous. The level of prices is somewhat high, owing to the recent large demand for the United States, and makers are disposed to hold out for full figures, under the impression that there will be at least one more "rush" from America prior to the coming into operation in July next of the duties imposed by the McKinley tariff. Whether this anticipation is or is not well founded will shortly be seen, but it must be confessed that it seems improbable at the moment. Very heavy stocks have been accumulated here or in the States by buyers, and the course of values on the other side appears to indicate that a drop is on the cards, the idea being that the American market cannot carry any larger quantity of tin plates than that which is already on hand. If that view is correct—and we should not be surprised to find it is—it follows that our tin-plate manufacturers have now seen the best of their great market and must be prepared to fight for the American trade on conditions which will be more onerous than at any former time. Exactly what

may be the competition of the American tin-plate makers cannot be foretold with accuracy, but there is a good deal of "blow" on the subject on the other side of the Atlantic, and if we are to believe some of the American newspapers, really marvelous progress is being made with the new industry. Many mills are said to be in progress, and there is constant jubilation among the protectionists at the driving out of the market of British tin plates. A very liberal discount may be safely taken off these statements, and it may be taken for granted that for some time after July next we shall send many tin plates across the Atlantic, yet in view of what is happening and may happen there, it would be prudent for our tin-plate makers to use diligence in cultivating new markets. A report has been circulated to the effect that they are doing so in an organized manner by sending representatives to India, Ceylon and China in order to teach the natives how to pack tea in tin-plate boxes. This report is of the *ben trovato* order. It is good enough to be true, and sufficiently likely to be so on the face of it, but our inquiries have failed to elicit that it is accurate. We have inquired in all likely quarters, but have not been able to obtain any corroboration of the statement. We hope, nevertheless, that it is founded on fact, and that steps will be taken to induce the tea planters to use tin plates instead of the clumsy old wooden chest with its not very wholesome lead lining. Experiments have proven that tea can be packed and will in all respects keep well in tin-plate boxes. Such boxes have been tried in Ceylon with marked success, and there is no reason whatever why they should not be used universally for the purpose in Ceylon and India. That method of packing would serve to distinguish the superior teas of our great Eastern dependency, and would have the great advantage of thereby breaking down the innate conservatism of the Chinese in the most effective manner. Apart from the tea trade, however, many new uses could be found for tin plates if the manufacturers will give their minds to the subject. The canning of fruit is becoming an industry in South Africa and Australia, and the preserved meat business is extending in many parts of the world. The loss of the American market—if it occurs—may prove to be the gain of the tin-plate makers if they have the resolution to grasp their nettle, throw off the chains of their financiers and exploit the world on their own account.

Exports.

FOR NELSON.

By *W. H. Peabody & Co.*—85 cases Edge Tools, 10,000 pounds Nails.
By *R. W. Forbes & Son.*—3000 pounds Nails, 48 boxes Horse Nails, 14 packages Hardware.
By *McLean Bros. & Co.*—2 dozen Meat Choppers, 1/2 dozen Miter Boxes, 8 dozen Tackle Blocks, 1 Drill, 14 Emery Wheels, 6 dozen Hammers, 4 dozen Braces, &c., 680 pounds Tacks, 42 dozen Harness Snaps, 4 dozen Mattocks, 6 dozen Wooden Rakes, 1200 pounds Horse Nails, 136 pounds Whetstones, 6 dozen Egg Beaters, 81 dozen Saws, 32 planes, 6 dozen Axes, 600 pounds Horse Nails, 1 gross Hog Wringers, 3 dozen Wringers, 1 dozen Lamps, 6 Velocipedes, 20 dozen Locks, 9 Velocipedes, 2 dozen Sash Cord, 3 dozen Mouse Traps, 24 Churns, 2 dozen Bench Screws, 1 gross Rat Traps, 6 Plows, 6 gross Lead Pencils, 16 sets Axes, 17 dozen Axes, 4 dozen Hardware, 1 dozen Lamps, 34,000 Metallic Cartridges, 2000 Shot Cartridges.

FOR DELAGOA BAY.

By *W. H. Crossman & Bro.*—25 dozen Wheelbarrows, 121 cases and 10 packages Builders' Hardware, 15 cases Agricultural Implements, 1150 pounds Sash Weights, 2 1/2 dozen Sash Cord, 22 packages Scales.

PER SHIP KENTMERE, APRIL 7, 1891, FOR MELBOURNE, AUSTRALIA.

By *Sherman & Lyon.*—36 dozen Locks.

By Yale & Towne Mfg. Company.—1310 pounds Locks.
 By Bissell Carpet Sweeper Company.—11 boxes Carpet Sweepers.
 By Meriden Britannia Company.—23 packages Plated Ware.
 By Simpson, Hall, Miller & Co.—8 casks and 28 packages Plated Ware.
 By W. & B. Douglas.—3 boxes Pumps.
 By A. S. Lascelles & Co.—6 cases Plated Ware.
 By W. K. Freeman.—1200 pounds Hardware, 3 packages Lampware, 32 dozen Forks, 5000 Shells, 8000 Cartridges.
 By Healy & Earl.—2 boxes Emery Wheels.
 By A. Field & Co.—2 cases Bolts, 3 cases and 1 barrel Ironware, 5 cases Carriage Hardware, 2 dozen Brushes.
 By R. W. Cameron & Co.—100 pounds Tools, 1 box Tools, 940 pounds Meat Stuffers, 825 pounds wooden blocks.
 By R. H. Dana & Co.—10 crates Corn Shellers, 140 dozen Axes, 82 dozen Forks, 40 reams Flint Paper, 25 kegs and 20 cases Nails, 36 dozen Picture Cord, 6 cases Hardware, 6 kegs Nails, 6 packages Hardware.
 By W. E. Peck.—2 cases Hardware.
 By Strong & Trowbridge.—598 pounds Stone, 1 dozen Hardware, $\frac{1}{2}$ gross Tack Hammers, 12 Pumps, 51 Meat Choppers, 3 dozen Saws, 30 dozen Nails, 55,000 Cartridges, 3 cases Cartridges, 16 dozen Tools, 3 cases Hammers, 1 case Locks, 1 dozen Wringers, 7 dozen Strainers, 30 kegs Nails, 75 pounds Hardware, 100,000 Rivets, 509 pounds Hardware.
 By W. H. Crossman & Bro.—3 cases Lamp Goods, 2 dozen Air Guns and Ammunition, 2 dozen Carpet Sweepers, 14 Ice-Cream Freezers, 27 dozen Wrenches, 54 dozen Traps, 84 pounds Tacks, 5 dozen Wrenches, 15,000 Loaded Shells, 10,000 Paper Shells, 10,000 Primers, 30 Churns, 51 cases Carpenters' Tools, 5 cases Builders' Hardware, 6 dozen Curry Combs, 22,400 pounds Barb Wire, 1 case Carriage Hardware, 62 cases Carpenters' Hardware, 15 Pumps, 1 gross Bush Hooks, 8 dozen Churns, 10,000 Fuse, 12 Tricycles, 112 pounds Stone.
 By H. W. Peabody & Co.—1 case Revolvers, 6 cases Builders' Hardware, 5 cases Chucks, 1 case Sandpaper, 1 case Cutlery, 1 case Hardware, 30 cases Lamp Ware, 1 case Brushes, 1 case Tools, 90 cases Edge Tools, 6 packages Corn Shellers, 8500 Cartridges, 1 case Fire Arms, 1 case Cartridges, 2 cases Lamp Ware, 30 packages Hardware, 2 cases Bolts, 1 case Strops, 2200 pounds Horse Nails, 2 cases Wire Cloth, 6 cases Lawn Mowers, 4 packages Pumps, 1 case Empty Shells, 4 cases Wringers, 6000 Empty Shells.
 By McLean Bros. & Rigg.—4 dozen Pumps, 15 dozen Locks, 10 cases Agate Ware, 12 dozen Braces, $\frac{1}{2}$ dozen Meat Choppers, 6 dozen Files, 784 packages Harvesting Machinery, 22 Guns, 2 dozen Mattocks, 34 dozen Thermometers, 144 dozen Hinges, 10 Air Guns, 1 dozen Drills, 15 dozen Door Springs, 12 dozen Lemon Drills, 58 dozen Locks, &c., 21 dozen Hoes, 34 Scales, 13 dozen Door Knobs, 27 pieces Plow Repairs, 1 case Plated Ware, 1 crate Windmill parts, 13 cases Hay Forks, 4 Potato Planters.
 By R. W. Forbes & Son.—12 Harrows, 1 case Fiber Ware, 60 pounds Metallic Packing, 1 crate Stone, 3 gross Barometers, 6 Tricycles, 12 Axes, 2 cases Agricultural Implements, 8 reams Flint Paper, 27 packages Carriage Hardware, 4 dozen Wringers, 12 dozen Bird Cages, 13 packages Hardware, 3 Cases Plated Ware, $\frac{1}{2}$ gross Emery Polish, 2 dozen Carpet Sweepers, 11 1-6 dozen Hammers, $\frac{1}{2}$ dozen Wringers, 13 packages Hardware.
 PER BARK JAMES A. WRIGHT, APRIL 8, 1891, FOR SYDNEY, N. S. W.
 By Edward Miller & Co.—16 packages Lamp Goods.
 By Hill & Hartridge.—18 boxes Nails.
 By Russell & Erwin Mfg. Company.—8 cases and 4 barrels Hardware.
 By V. Basanta.—500 Axes.
 By Meriden Britannia Company.—12 packages Plated Ware.
 By Goulds Mfg. Company.—1 Pump.
 By R. W. Forbes & Son.—1 case Washers, 9 packages Carriage Hardware.
 By Strong & Trowbridge.—10 dozen Axes, 36 dozen Mouse Traps, 16 Refrigerators, 10 dozen Spades, 40 dozen Axes and Hatchets, 4 dozen Chisels, 13 dozen Braces, 793 pounds Nails, 12 Forges, 20 dozen Hammers, 50 pounds Hardware.
 By Arkell & Douglas.—4 dozen Picks, 245 pounds Hames, 4 cases Nuts and Bolts, 5 cases Wooden Hames, &c., 14 cases Fire-arms, 3 barrels Cow Bells, 6 Scales, 1 dozen Saw Sets, 6 dozen Reflectors, 8 dozen Braces, 10 dozen Rakes, 86 dozen Axes, 36 dozen Hatchets, 5 dozen Bench Screws, 6 dozen Saws, 3 dozen Plated Ware, 11 dozen Axes, 1 dozen Ladders, 4 dozen Bench Screws, 6 dozen Hoes, 12 dozen Hand Spikes, 6 Forges, 2 dozen Wagon Jacks, 2 dozen Traps, 1 dozen Carpet Sweepers, 12 dozen Rakes, 100 pounds Twine, 4

cases Bolts, 9 dozen Curry Combs, 5 gross Metal Polish, 670 pounds Bolts.
 By W. H. Crossman & Bro.—6 dozen Forks, 3 dozen Axes, 22 dozen Hoes, 28 dozen Cages, 9 cases Hardware, 2 dozen Air Guns, 3 dozen Store Trucks, 11 dozen Braces, 1000 pounds Staples, 1 gross Egg Beaters, 1 case Agricultural Implements, 13 cases Hardware, 5 dozen Razor Strops, 10 dozen Snaths, 4 packages Hardware.
 By S. Hoffnung & Co.—79 pounds Wire, 75 pounds Lamp Goods, 6 Carpet Sweepers, 1 dozen Air Guns, 5 dozen Churns, 1 case Hardware, 12 dozen Lamp Goods, 1 dozen Scales.
 PER BARK CHAS. G. RICE, APRIL 9, 1891, FOR BRISBANE, QUEENSLAND.
 By Sherman & Lyon.—782 pounds Lampware.
 By W. K. Freeman.—1 case Hardware.
 By Mailler & Quereau.—1 barrel Tinned Wire.
 By Simpson, Hall, Miller & Co.—1 cask Plated Ware.
 By J. A. Babcock & Co.—2 cases Plated Ware.
 By Meriden Britannia Company.—2 packages Plated Ware.
 By Reed & Barton.—1 barrel Plated Ware.
 By Edward Miller & Co.—16 boxes and 9 casks Lamp Goods.
 By National Mfg. Company.—6 cases Wire Goods, 5 crates Tin Sifters.
 By R. W. Forbes & Son.—2 dozen Meat Choppers.
 By Strong & Trowbridge.—4 cases Bolts, 3 cases Hames, 3 packages Hardware, 1 case Bolts.
 By Arkell & Douglas.—368 dozen Axes, 32 dozen Lanterns, 12 dozen Wrenches, 2000 Primers, 18 dozen Cow Bells, 10 dozen Hammers, 2 dozen Meat Cutters, 24 sets Axes, 300 feet Hose, 440 pounds Twine, 100 Stoves, 6 dozen Braces, 26 Lawn Mowers, 1 dozen Forges, 4 dozen Oil Stones, 3 dozen Oilers, $1\frac{1}{2}$ dozen Revolvers, 1 dozen Churns, 15 dozen Mowers, 12 dozen Saws, 6 dozen Snaths, 6 dozen Traps, 3 dozen Latches, 2 dozen Bush Hooks, 8 dozen Rakes, 6 dozen Drills, 50 dozen Axes, 440 pounds Tinware, &c.; 930 pounds Tinware, &c.
 By S. Hoffnung & Co.—8 dozen Bush Hooks, $19\frac{1}{2}$ dozen Lamp Goods, 27 dozen Lamp Goods, 9 dozen Bells, 60 dozen Axes, 22 dozen Hatchets, 5 dozen Mattocks, $1\frac{1}{2}$ dozen Knives.

It is Reported—

That A. L. Cressy, Hardware, Modesto, Cal., has sold out his business to O. L. Wakefield and J. M. Benham.
 That Thatcher & Bancroft are building a Hardware store at Union Hill, N. Y.
 That Kuline & Felt, wholesale Hardware dealers, Council Bluffs, Iowa, have dissolved.
 That James McMahon will open a Hardware store at Durhamville, N. Y.
 That Vincent & Roberts, Sioux Falls, S. D., dealers in Hardware, Stoves, &c., have been succeeded by C. H. Vincent, Mr. Roberts having retired from the firm.
 That O'Brien & Maxfield have succeeded Flint & Maxfield in the Hardware business at Potsdam, N. Y.
 That Kitchen's Hardware store at Schomberg, Ont., was recently destroyed by fire.
 That Brown, Northrup & Co. are a new Hardware firm at Asheville, N. C.
 That J. T. Pomery will open a Hardware store in the near future at Hiawatha, Kan.
 That C. A. Leager, Amboy, Ill., has disposed of his Hardware business to Leon & Morris, who will continue it at the old stand.
 That the Hardware store of Miller & Miller, Grand Rapids, Mich., was destroyed by fire on the 6th inst. The loss is in the neighborhood of \$2000, with partial insurance.
 That the Lytle & Eckels Hardware Company, Decatur, Ill., have been incorporated, with a capital of \$20,000.
 That B. Lottridge is opening a Hardware store at Brookfield, Mo.
 That Brock & Breckenridge have succeeded Cummings & Brock, dealers in Hardware, &c., Lewiston, Ill.

That Charles Greenwood, Hardware, Stoves, Guns and Agricultural Implements, Lewiston, Maine, has sold out his business to J. H. Chase.
 That Johnson & Co. succeed Davis & Schroder in the Hardware business at San Jose, Cal.
 That G. T. Echols, dealer in Hardware, Claude, Texas, has sold out to R. H. McAlpine.
 That W. M. King has purchased an interest in F. P. Carruth's Hardware and Implement store, at Orange, Mass.
 That the establishment of Copeland & Van Pelt, dealers in Hardware, Stoves, Guns and Agricultural Implements, Bal-linger, Texas, was recently destroyed by fire. The loss aggregates \$12,000; insurance, \$6500.
 That J. B. Murray, Hardware, Arapahoe, Neb., has closed up his business.
 That R. B. Canfield, Lenox, Mass., is about to retire from the Hardware business.
 That Treman, King & Co., Hardware, Stoves, &c., Ithaca, N. Y., have enlarged their store to enable them to better meet the demands of their increasing business.
 That a new Hardware store has been opened at Meyersdale, Pa., by Mr. Cover.
 That H. E. Clark, Hardware, Imple-ments, &c., Naples, N. Y., has sold out his business to a new firm, the style of which is Doolittle & Graham.
 That C. S. Ellis, Elkland, Pa., has disposed of his Hardware store to Rice Bros.
 That Stone & Davis, Hardware, will occupy temporary quarters in South Glens Falls, N. Y., until Stewart's Block is completed, when they will occupy one of its stores.
 That Guyer & Son, Westport, Conn., dealers in Hardware and Paints, have re-moved to new quarters, where with increased facilities they are in better shape to handle their growing business.
 That P. Christenson, dealer in Hardware at Sleepy Eye, Minn., has admitted Henry Opperman as partner in the business.
 That J. H. McArthur & Co., Warren, Minn., will open up a Hardware store in connection with their lumber yard at that point.
 That the National Hardware Company of Cincinnati, Ohio, have been incor-porated, with a capital stock of \$35,000.
 That Guy & Walter, Hardware dealers, Arcadia, Ind., have disposed of their business to W. D. Allis, who will continue it at the old stand.
 That Baker & Foster, Beverly, Mass., have removed their Hardware business to larger quarters.
 That Heckel & Paine, Columbia, Pa., have sold out their Hardware business to Stoner & Hall.
 That P. F. McClure & Co., Pierre, S. D., Hardware, have sold out to Smith & Rose.
 That Brock & Priest, Hardware, Rus-sellville, Ind., have sold out their store to Prather Bros.
 That Hoffmann Bros. have bought Hattie E. Turnbull's Hardware store at Spring-ville, Iowa.
 That Winters & Moyer, Hardware and Paints, Reading, Pa., have dissolved partnership, the latter retiring. The business will hereafter be conducted by Mr. Win-ters.
 That the Whittaker & Kirk Hardware Company, Toledo, Ohio, have been incor-porated. The capital is stated to be \$25,000.
 That I. L. Rathbone and E. T. Ashley will embark in the Hardware business at

Newark, Ohio, about May 1. Both are well known in their community and have been employed in the Hardware, tin and plumbing business for many years.

That J. Dwyer, dealer in Hardware, Penn Yan, N. Y., has been burned out.

That Morgan & Greer will open a new Hardware store at Clayville, Pa.

That Myers Brothers & Co.'s Hardware and Stove store at Tiffin, Ohio, was recently destroyed by fire. The loss is estimated at \$20,000.

That F. T. Wilcox succeeds S. S. Wilcox & Co., Big Rapids, Mich., in the Hardware business.

That C. F. Scharpf, Hardware, La Crosse, Wis., is closing out his business.

That G. M. Dayton is the proprietor of a new Hardware store at Port Huron, Mich. He will carry a large and varied stock of goods.

That the store of John Boemply, Hardware, Marshalltown, Iowa, was recently burned out.

That D. B. White, Hardware, Canadea, N. Y., has sold out to Ellis Beeber and E. R. Voorhees.

That J. E. Rice, Southboro, Mass., will move his Hardware business and family to Maynard, Mass., about the First of May.

That the Hardware store of Evans & Rose Savannah, Ga., was burglarized on the 7th inst. Pocket Knives and Razors comprised the more valuable part of the stolen booty.

That L. P. Woodbury, dealer in Hardware and Agricultural Implements, Northampton, Mass., has bought the Hardware stock of Mr. Dunn, Chicopee Falls, Mass.

That R. G. Lyon of the Hardware firm of Sanford & Lyon, Vassar, Mich., has purchased his partner's interest, and will continue the business alone.

That the Hardware and Implement establishment of William Bloedorn, Platte Center, Neb., was entered by burglars on the 4th inst. Among the articles stolen were pocket knives, razors, revolvers, cartridges, &c. The value of the pilfered goods is about \$150.

That Rechlin & Frank is the title of a Hardware firm recently established at Bay City, Mich.

That G. L. Maker will open a new Hardware store at Norwood, Mass.

That the Thurston Hardware Company, Thurston, Ohio, have commenced business.

That a new Hardware store has been opened at Davisburgh, Mich., under the proprietorship of W. H. Smale.

Electric Revolving Show Stands.

FOR ECONOMY of space and effectiveness of display the Revolving Show Stand has special advantages, as when it is in operation it is equivalent to a large increase in the space devoted to the display. An electric Revolving Stand is an attraction to passers by as it constantly revolves, and people who are not in the habit of looking in show windows will often stand and gaze at such a device as it goes round and round. We illustrate in Figs. 1 and 2 two styles of Revolving Stands which are put upon the market by Frederick Pearce, 77 and 79 John street, New York. Fig. 1 shows a single-motor Stand, and also indicates one of the methods of arranging the platforms for the display of goods. Other styles are made, such as obelisk, lighthouse and steeple-shaped designs, or are made to order any height or shape desired. As shown in Fig. 1, it is capable of revolving 50 pounds. Fig. 2 illustrates

a Stand with double motor, which will carry 150 pounds with four cells of battery, and fitted with stained black walnut plate 30 inches in diameter. It is stated that the power necessary to propel electric Show Stands has been greatly reduced of late, by minute calculations and practical experiments, and loading to the greatest possible efficiency obtainable from both the electrical and mechanical parts. After

goods hold remarkably steady, in the absence of more than ordinary competition and lack of outside disturbing influences.

White Lead.—Orders for 5-ton and larger lots of pure White Lead have been more numerous the past week than in any corresponding period previously this season, and the indications are that jobbers and other large buyers have found it necessary to replenish supplies. The dis-

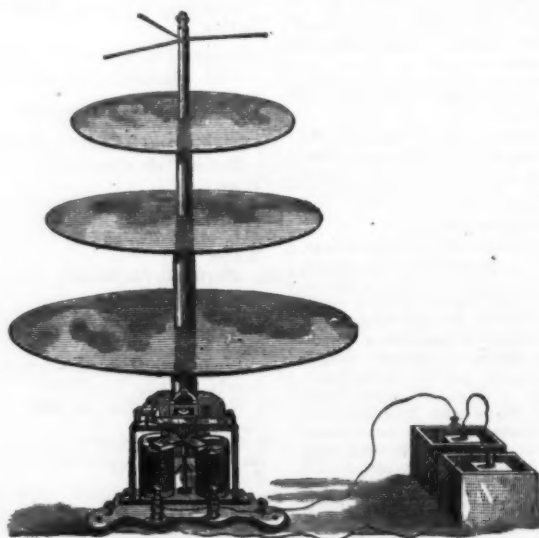


Fig. 1.—Electric Revolving Show Stand.

setting up the battery, the turning of the switch to start the Stand revolving, and again at night to stop it, is all the attention required. It is claimed one can be run for three months, ten hours each day, at a cost per day of 2 cents; at the end of three months the zincs require cleaning, and are replaced with a new charge of

tribution of ordinary 'jobbing quantities has also been on a liberal scale, making altogether a quite active week. The cheaper varieties of pigment have also been moving quite freely, and several manufacturers report improvement upon last week's sales. Jobbers vary a little from the corrodors' official list, but other-

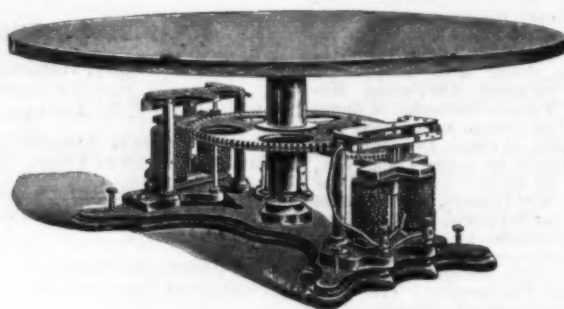


Fig. 2.—Double Motor Revolving Show Stand.

blue stone, and are then serviceable for three months longer. After six months' service new zincs are substituted for the old ones, to continue for the remainder of the year, at the same rate of expense per day.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Business has been livelier all along the line, the result, in part, at least, of the more favorable weather conditions for outdoor and other work in which the various pigments are largely employed. Purchases by local dealers and the trade at nearby points figure most conspicuously in the improvement, but interior orders show a qualifying increase, and the general distribution has been more satisfactory than in any previous week since the opening of the spring trade. Outside of this turn for the better in the movement of goods there is very little change to note. Values on nearly all the staple

wise there is little or no movement in values.

Paris Green.—The following price-list has been adopted by the leading manufacturers. The prices are somewhat higher than had been looked for in view of the fact that some firms maintain an independent attitude:

	Arsenic, kegs or casks, 100 to 175 lbs.	Kegs, 14, 28 and 56 lb. cans or boxes, 2 to 5 lb.	1-lb. paper boxes.	1/2-lb. paper boxes.	1/4-lb. paper boxes.
10,000 lbs. or over.	14	14 1/2	16	16 1/2	18 1/2
5,000 to 10,000 lbs.	14 1/2	15	16 1/2	17	19
1,000 to 5,000 lbs.	14 1/2	15 1/2	16 1/2	17 1/2	19 1/2
Less than 1,000 lbs.	15 1/2	16 1/2	17 1/2	18 1/2	21 1/2

Terms, payable July 1. Discount, 6 per cent. per annum for anticipated payment.

Red Lead and Litharge.—The demand is running quite free and the market retains all the favorable features that have pre-

vailed previously this month. In point of fact the market is wholly under the control of the Lead Trust, and prices are readily maintained.

Zincs.—American Oxide is very firmly held at the prices heretofore quoted for the several grades, and there is not the slightest sign of any impending changes. Deliveries to jobbers and the large consumers continue free, and the jobbing movement is good, while new orders received by manufacturers are fully up to the average for the season. The popular foreign brands also continue to meet with fairly liberal sale and are bringing full former prices.

Colors.—For the general line of Dry Colors there has been a fairly active demand throughout the week, with considerable movement of round lots from first hands, in addition to a full jobbing distribution. Prices are firm all along the line. English Venetian Red, the arrivals of which have been heavy, brought \$1.05 @ \$1.15, as to brand and quantity, and several large lots of American were placed at \$1 @ \$1.10 for future delivery. Quick-silver Vermilion has been taken freely at the recently reduced prices, and Carmine in about the usual quantities. Orange Mineral went at 8½¢ @ 9½¢ for domestic brands and 9½¢ @ 10¢ for foreign. In other lines there has been the full average movement at generally steady prices. Oil Colors and ready-mixed Paints have had freer sale than in any preceding week this season.

Miscellaneous.—Several thousand tons of Block Chalk have been purchased, to arrive by sail vessel, at \$2.75 @ \$2.85, and the prospects are better for a fuller supply in the near future. Whiting and Paris White remain steady and in fairly active demand. There is no change to report on Barytes, Terra Alba, China Clay or Talc.

Oils and Turpentine.

The past week has been as barren of interesting developments as was the one preceding it. Operations throughout have continued within very moderate bounds, and anything outside of the ordinary routine in the way of demand is strictly the exception. Prices have been practically stationary all along the line, in the absence of change in the relation of supply and demand or other conditions having a bearing upon values. The distribution in a jobbing way is doubtless up to the average for the season.

Linseed Oil.—The improvement in the Paint trade is reflected in a freer movement of this article, and current sales appear to be quite in line with what is customary at this season of the year. Some sales are making of outside brands in this market, but it does not appear that any shading of prices is indulged in, although city crushers are still securing the lion's share of the trade in this city and immediate vicinity. City brands are selling at the same prices that have ruled for several weeks past.

Cotton Seed Oils.—Prime quality Oil, crude and refined, continues scarce. There is very little of it here and scarcely any offering from Southern markets. Prices, therefore, hold very firm. On the lower grades, however, there is some contrast. Home buyers are indifferent, and exporters extremely so, some even reselling here in a moderate way. Market value on the lower grades shows about 1¢ @ 2¢ decline since the beginning of the month, and there is little probability of a turn for the better before the middle of May.

Lard Oil.—Demand for this lubricant has continued brisk, and the market retains all the elements of firmness noted last week. The cost of raw material continues high, pressers are turning out comparatively little Oil beyond what orders call for, and the offering from outside sources

is no greater than usual. There are no signs of raw material becoming much cheaper in the immediate future, and until there is a change Oil prices are unlikely to go lower.

Fish Oils.—There has been some inquiry for crude Menhaden Oil at 25¢, but holders stand out firmly for 28¢, and no business transpires. Crude Sperm Oil is unchanged. The various manufactured products are moving off fairly in jobbing quantities at old prices.

Miscellaneous.—Olive Oil is more freely offered on the spot, and may be secured at slightly lower prices. Spot lots of Coconut Oil are still firmly held, but stock on the way is offered at a round concession. Palm Oil and Red Oils are unchanged.

Spirits Turpentine.—The local demand has been somewhat disappointed, and advices from the South indicate quiet trade at the primary points. Prices are slightly weaker at 40¢ for plain barrels and 40½¢ for machine barrels.

The Self-Weighing Shot Case.

VANDERGRIFT MFG. COMPANY, Jamestown, N. Y., are offering the trade a Shot Case, as illustrated herewith. It is described as being nicely finished in antique oak, japanned handles, with glass openings in front showing the Shot, and as forming an ornamental addition to store fixtures. It



The Self Weighing Shot Case.

is 30 inches long, 18 inches high and 9 inches deep, containing ten bins for different sizes of Shot, each bin having a capacity of 25 pounds. Beneath each bin is an adjustable cylinder, contrived to deliver exactly 1 pound of Shot into the drawer in the lower portion of the case at each quarter turn and reverse of the handle. The manufacturers claim that it is reliable, convenient and accurate.

Salvador has contracted for the establishment of direct steamship communication with Europe, granting a subsidy.

Labor circles in England are excited by the conviction and sentence to imprisonment of Secretary Wilson of the National Amalgamated Seamen's and Firemen's Union, who has been a dangerous enemy of the Shipowners' Federation. He was prosecuted for boycotting and interfering with non-unionists in the performance of their duties. The principle involved is that in future strikers may not legally influence men who have taken their places, either by moral suasion or otherwise, to the detriment of the interests of those who have employed them.

A Large Wire Tramway.

A wire tramway of unusual proportion has just been completed by the Trenton Iron Company of Trenton, N. J., for the Bunker Hill and Sullivan Mining and Concentrating Company of Wardner, Idaho, in the Cœur d'Alene mining region. The tramway contains 52 supports. The highest one is situated in the heart of Wardner and is 89 feet 6 inches high. The tramway is 8907 feet, or 1½ miles, in length. The standing cable is 1½ inches on the loaded side and 1 inch on the empty side. The traction cable is ¾ inch, made of crucible steel, 6 strands, 12 wires to the strand, with hemp core, spliced in the regular manner. On this cable lugs 1½ inches in diameter and 2 inches long are set at intervals of 135 feet. The hemp core of the cable is cut and a copper pin driven through the lug and cable and the inner chamber of the lug filled with babbitt metal. The breaking strain of the traction cable is 21,000 pounds, giving a factor of safety of five. The cable contains 133 buckets, which are placed at intervals of 135 feet. Each bucket has a carrying capacity of 5 cubic feet or 700 pounds. The speed of the tramway is regulated by the brakeman at the brake station, and at the regular speed the buckets will pass that point every 35 to 40 seconds, which at that rate will enable the company to transport in 10 hours 400 tons, the required amount to keep the concentrator running 24 hours.

At each end and brake station the main sheaves are 8 feet in diameter and the

grooves are filled with rubber and leather packing to prevent the wearing of the traction cable which passes around the sheaves. In front of each main sheave stands a single sheave 6 feet in diameter, having a groove filled with the same material. This cable plays around these sheaves in the same manner as a chain in a chain block. At both terminal points and the brake station the buckets leave both cables and run upon a track which is elevated about 8 feet from the floor, and at any of these points buckets can be taken off or put on in a few seconds. The advantage of disconnecting the buckets from the cables at the ore bins, at both mine and concentrator, is that the men in charge of the buckets can load them from any points desired and also empty them in any part of the bin. If for any reason the attendants upon the buckets cannot get them into position in time to catch the lug, the lug passes out without the bucket, which can be placed on the next lug. To prevent any slack in the cables, heavy weights are used at the brake station, which keeps them of uniform tension. The bins at both ends of the tramway have a capacity of 5000 tons each.

Mail sorting at sea proves to be a success

The Hattie Ensley Record.

The Hattie Ensley Furnace, at Sheffield, Ala., owned and operated by Enoch Ensley, has sent out the following data relating to its record: The furnace is 17 x 75 feet, with three Whitwell stoves, 18 x 55 feet; two Dickson engines, 4 x 7 feet. The following are analyses of the iron:

	No. 1 foundry	Gray forge.
Iron.....	92.79	94.268
Graphite.....	3.372	.....
Combined carbon.....	0.240	.....
Silicon.....	2.287	0.66
Sulphur.....	0.009	0.142
Phosphorus.....	0.583	0.55
Manganese.....	0.634	0.52
Undetermined.....	0.085	.....

The best work of the furnace has been as follows:

Week ending October 30, 1890.... 1,139½ tons.
Best day (October 29)..... 185 1-6 tons.
Average, per day..... 162½ tons.
Classification: 64 per cent. foundry; 36 per cent. forge.

The blast pressure averaged 5½ pounds, the temperature, 1151° F., so that the unused capacity of the engines was 26 per cent.

The following was the consumption of material in pounds per ton of iron of 2300 pounds:

Pocahontas coke..... 2,319
Darlington limestone..... 1,013
Ensley's Russellville ore..... 4,258
No scrap iron used.
No coal used.

The yield of the ore was: By pounds, 54 per cent. By tons (ore 2240, iron 2300), 52½ per cent.

The Studebaker Wagon Works.

The famous wagon works of the Studebaker Bros. Mfg. Company, at South Bend, Ind., have a world-wide reputation. They are such large consumers of iron and steel that the following description of the plant, taken from the *Chicago Inter-Ocean*, will be perused by our readers with much interest.

John Studebaker started the business of horseshoeing, wagon making, &c., in 1840. He taught his sons to make wagons, and to make them the best, and in 1852 the boys started a general smithy business in South Bend, Ind. The energy of the members of the firm brought them success, and notwithstanding the fact that their works were twice destroyed by fire they prospered. They were incorporated in 1868, with a capital stock of \$1,000,000, an amount which is now greatly increased by surplus earnings, and have the most extensive carriage and wagon making plant in the world. The wagon works include the old plant, which has been in use for years, together with additions more or less extensive made each year since, and the new plant, which is not yet occupied, but will be devoted to the manufacture of spring wagons, buggies and carriages. The old plant has a frontage of 1020 feet on the Lake Shore Railroad side, and includes 26 mechanical departments, each of which has its foreman. In these departments may be seen 675 machines of different kinds, which are running by power furnished by engines, two of them aggregating 700 horse-power, and two batteries of boilers of 1000 horse-power, under which is burned crude oil with steam jet and the refuse matter from the wood shops, which is carried in by air blast. In a walk through the various shops the visitor may see welding by electric heat; a trip hammer department, where forgings of all kinds are made; machinery turning out bolts, clips, &c.; a spring factory, where seat springs and heavy wagon springs are made; a machine shop, including lathes, milling

machines, planers, drills, punches and all tools necessary for making or repairing their own machinery. There is a plumbing department and a tinshop for their own use; a pattern shop, and a room where such plating as they need in gold, silver or nickel is done. At one end of this wing is the steel skein works, where the Studebaker patent steel skein is produced in enormous quantities, both for their own use and for the trade. Nearly everything used in the factory is made up here from the raw material.

In the wood shops may be seen enormous stocks of wood work in all stages of preparation for use in a wagon and machinery of every kind for its making. The lumber yards contain the largest stock of hardwood lumber of all kinds in the country. The receipts during 1890 were nearly 200 carloads of lumber per month. This enormous stock is rendered necessary by the fact that they thoroughly season everything for from two to four years. In the various departments may be seen many special machines, which seem to act as if by their own volition. One of them being given a wagon hub will bore holes in it, and then mortise it with chisels for the spoke, giving the correct spacing, angle and stagger, doing the work automatically, swiftly and perfectly. Others will drive spokes with a sledge hammer, striking with a rapidity, force and precision unattainable by hand. Still another will shape the spindles of the axle for the reception of the iron thimble skeins on which the wheels turn, performing the work with accuracy and dispatch. This, when formerly done by hand, required a high degree of mechanical skill, and was then often unsatisfactorily executed.

Near the wood shop is the department for the manufacture of combination seats, which are made of five veneers glued together over a mold, bound with steel on top and let into a groove on the bottom, making the neatest, lightest and strongest seat presented to the trade. They have a capacity of 30,000 of these per annum. Dashes are also made of the same material.

The new buildings have a floor surface of 10 acres. They are built in the most substantial manner, and are equipped with everything which can facilitate the business. The stories are very high, and are so arranged that if any part is attacked by fire it must burn very slowly. The joists are heavy and wide apart, and the upper floors are 4 inches thick.

The company have a thoroughly organized fire brigade of their own, consisting of 30 or 40 men, who are regularly drilled in their work. They have an inexhaustible supply of water; pumps with a capacity of 3,500,000 gallons per day of 24 hours; electric fire alarms throughout the buildings, and gongs at the houses of eight of the foremen. A number of the fire brigade sleep in the hose house, and the men can get a stream of water on a fire in three minutes at any hour of the day or night. They have hose, stand pipes, automatic overhead sprinklers, grenades, and a hose house with a complete outfit of reels, alarms, and a beautifully furnished reading room and library for the firemen's use. The city fire plugs and alarm boxes are also distributed throughout the works.

The electric-light plant consists of one large engine of 250 horse-power and six dynamos, two for welding and four supplying the current to 200 Thompson-Houston 2000 candle-power arc lights. In addition to the foregoing, there is a dynamo for supplying the machine shop and offices with 250 16 candle-power incandescent lights. Electricity is also the silent monitor of the watchman's faithfulness and the fireman's activity.

Heat is furnished by a hot-air plant, and ventilation by a powerful Sturtevant

fan. In the new plant there is a Corliss engine of 700 horse power, with a 30-ton fly wheel, carrying a leather belt 48 inches wide and 146 feet long. Fifteen thousand hides had to be handled to get enough good leather to make this belt. There are engines aggregating 969 horse-power in the new plant. The total number of engines in the new and old plants, not including the carriage works, is 14. The mere frontage of the factory buildings on the Lake Shore and Michigan Southern Railway, and on Lafayette and Tutt streets, makes an unbroken line of brick and mortar exactly ½ mile in length, although many of the most considerable factory buildings are not included in this frontage.

Besides the plants above described, the company operates a carriage factory at the corner of Michigan and Jefferson streets in South Bend, which factory is ½ mile distant from the works described in the foregoing. The carriage works employ about 250 hands. The vehicles made here range from the lightest pony cart to the heavy landau, but all of first-class grades.

The company also have another large factory and repository at Nos. 203, 204, 205 and 206 Michigan avenue, Chicago, on the lake front, between the Auditorium and the Art Institute, where they employ a battery of boilers of 1000 horse-power, an engine of 100 horse-power, a 45 arc light dynamo and 125 incandescent lights. They run freight and passenger elevators, and have a full line of wood and iron working machinery on the eighth floor, giving employment to about 150 men. It is declared by those familiar with the subject that these warerooms for size, elegance, and the variety and richness of the display made of buggies, carriages, broughams, landaus, coaches, &c., have no equal in the world. The company employ 1500 men in their South Bend works.

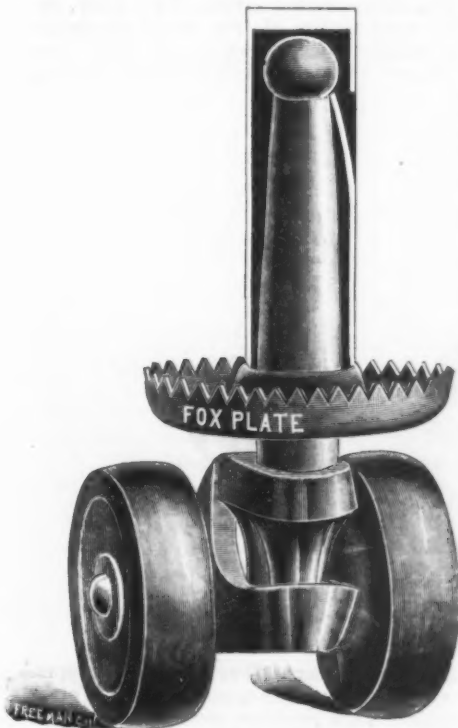
The character of the Studebaker vehicles is well known. No better comment can be made upon it than a reference to the success of the business, which has been built up on merit alone. The sales are made in every State and Territory in the Union, as well as in many foreign countries. The company have 1500 agencies and a large force of traveling men. The officers are Clem Studebaker, president; J. M. Studebaker, vice-president; P. E. Studebaker, treasurer (in charge of Chicago house), and George M. Studebaker, secretary.

The Alabama Scientific and Industrial Association has been in session at Anniston, Ala., during the past week. A great many papers were read and discussed, the majority dealing with Southern development. Professor Phillips, secretary of the association, dwelt on the subject of development in steel making in the South, and expressed the opinion that the basic process will soon be in extensive use, and stated that the royalty claimed on it could not be collected. B. F. Peacock read a paper on the "Future of the Iron and Steel Industries of Alabama," in which he gave a sketch of the early steps in the iron industry of the State, and also predicted the extensive use of the basic process, notwithstanding the policy of the owners of the patents, "because there are other substitutes for the basic furnace linings outside the Steel Patent Company's rights that will practically answer the same purpose without paying this unreasonable tax of \$1 per ton."

It is reported that the Cranberry Furnace is making some exceptionally low phosphorus pig, which is being taken by Park, Brother & Co. of Pittsburgh. There is some talk of building a large steel plant at Cranberry.

Fox Socket Caster.

Gwinner, Dowrey & Co., Hamilton, Ohio, are introducing a caster, as illustrated herewith. The stem of this caster is made of gray iron, the other parts of malleable iron; the wheels are either gray iron

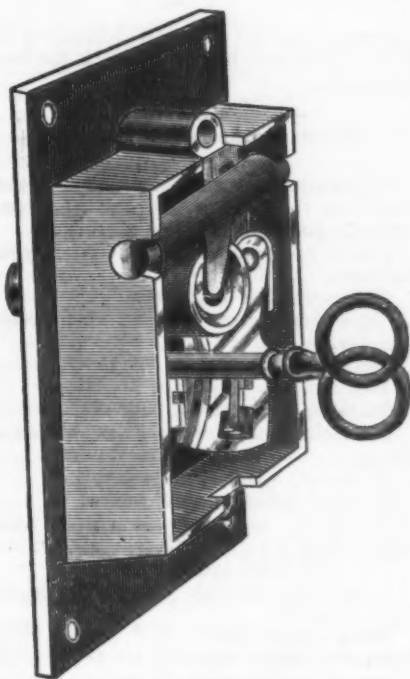


Fox Socket Caster.

or lignum vitae. The socket is driven in place at the factory; the track plate acts as a protection for the foot of the furniture in moving or shipping. The stem of the caster is held in place by the spring in the socket, and can easily be attached or detached.

Sliding-Door Lock.

Barrows Mfg. Company, Lockport, Ill., are introducing a lock of novel construction, as illustrated herewith. It is made



Sliding-Door Lock.

of brass, with nickel-plated key, so con-

structed that the bolt shoots out at right angles to the face of the lock. The lock is adapted and made for use upon the sliding doors of upright showcases, bookcases, sideboards, &c., which are so made that one door slides by another or by the jamb. It is to be mortised in on the back of the face stile, showing nothing upon the front except the keyhole or key escutcheon. When the key is inserted and turned the bolt shoots backward into the keeper, which is placed upon the face of the rear stile or on the jamb, thus locking the door by preventing its being moved sideways. The lock is made of cast bronze metal, with three rack tumblers, and is neat and durable in appearance.

Champion Ice Tongs.

Erie Wringer Mfg. Company, Pittsburgh, Pa., are introducing ice tongs, as illustrated herewith. These tongs are made with malleable-iron handles, Bes-

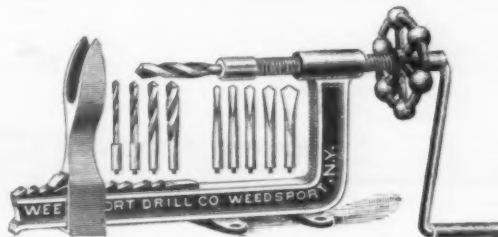


Champion Ice Tongs.

semer-steel jaws, and are finished in japan and nickel plate. Attention is directed to the form of the handle, which is so arranged as to add to the convenience and comfort of those using the tongs.

Combination Clamp and Drill.

Weedspoor Drill Company, Weedspoor, N. Y., are putting on the market a Combination Clamp and Drill, as illustrated herewith. It has a malleable frame and sliding clamp, with wrought-iron screw feed and brass bearings. It is designed



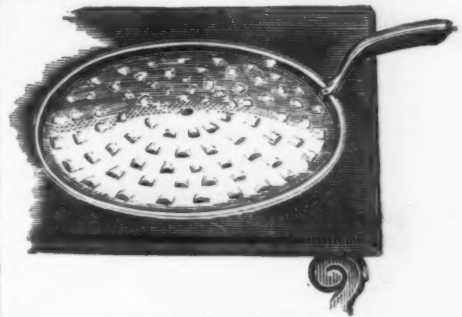
Combination Clamp and Drill.

to drill holes for any sized bolt found in a hardware store, and also to countersink for any size screw or tire bolt. It may be used as a wood clamp, bench vise and hand drill. Five drills are furnished with each machine, either diamond point or Syracuse twist, as ordered, the sizes being $\frac{1}{16}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch. It is referred to as working easily, being durable in construction and handsome in appearance.

Jim's Perfect Broiler.

Harkins & Willis, Ann Arbor, Mich., are putting on the market a broiler, as illustrated herewith. It consists of a con-

having a perforated flame-spreader attached to the under side. It is stated that with the openings thus raised, the meat is held so that the heat can pass under it, searing it at once, while what little juice



Jim's Perfect Broiler.

escapes runs to the edge of the broiler. The manufacturers claim that it broils quickly, is easily cleaned, and is adapted for use with gas, gasoline, coal or wood.

American Tripoli Company, Carthage, Mo., in reply to the question which has often been asked as to what tripoli is, state that it is a porous white rock which analyzes over 98 per cent. silicate, and when put through a reduction and milling process into a fine bolted flour is used as a metal polish. The grit of tripoli, it is stated, is exceedingly sharp and yet so soft that it will not scratch the finest metal surfaces. It is used, we are advised, by manufacturers of metal polish, composition and rouge, and also by railroad men and others having use for a dry polish. A water-filter disk is also made from the rock, the porous nature of which permits waters to percolate through it.

H. K. Porter & Co., builders of light locomotives, at Pittsburgh, have recently completed the erection of a compound air motor for use in a coal mine, which has been successfully tested on the work for which it is intended. It can make two round trips of, say, $\frac{1}{4}$ mile with one change of air, hauling a load of 50 tons of coal up grades of 2 and 3 per cent. The locomotive has cylinders 8 x 14 inches, four driving wheels 24 inches in diameter, and is 5 feet high by 16 feet long, weighing 9 tons. The air is received into two tanks 33 inches in diameter, the maximum

pressure usually being 350 pounds. In order to be seen in the mine and warn the miners of the approach of the locomotive, the tank heads are painted white. At the charging station a large receiver is filled from the compressor, and from this receiver the locomotive tanks take their charge. Radial drawfans are used so as to pass around sharp curves. No complicated devices are used, and no trouble from refrigeration is experienced, while the danger from explosion by igniting gas in the mine is entirely removed and the ventilation not interfered with. It is claimed that, including compressor, the first cost is less than that of a similar line using electrical, and the maintenance less expensive.

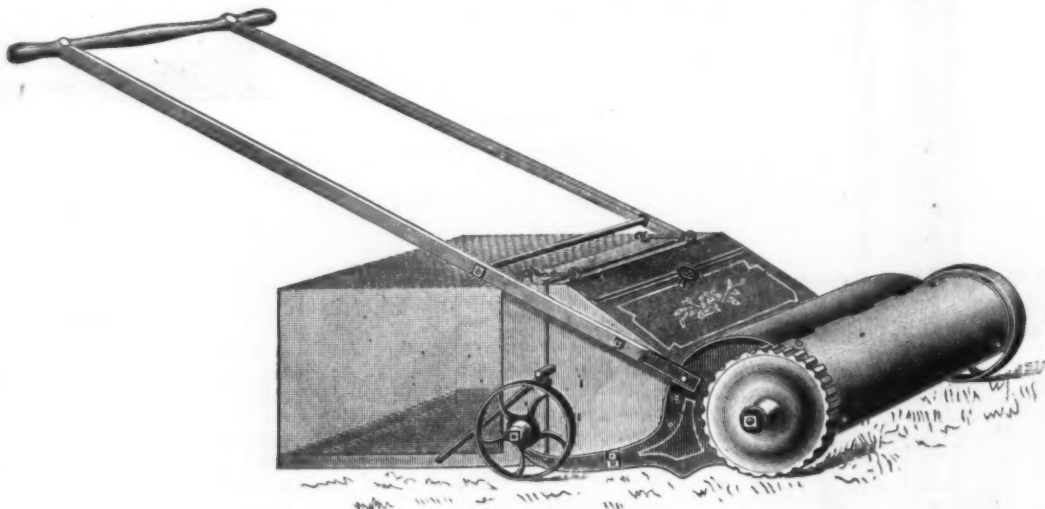
Model Lawn Sweeper.

Thompson Sweeper and Machine Company, Elkhart, Ind., are introducing a lawn sweeper, as illustrated herewith. This is not an attachment to a mower, but a separate machine. A revolving brush is suspended in a pivoted frame behind the axle, and parallel with it. It is stated that by means of a yielding spring the brush is pressed against the ground until a resistance, such as tall grass or an uneven surface, is met, when the brush is

three-quarter size, while Fig. 2, showing the Gem, is a full-size cut. These picks have polished iron handles, with points of steel nicely fitted into the handles and held by a screw. The picks are packed with a turned wood shield on every point, and with an extra point with each handle to insert in case the first one should be broken. The Royal is designed for use in the ice chest and the Gem for table use or in sick rooms. The handle of the latter is shaped so as to prevent rolling when laid down. It is claimed that ice

pin is grooved and can be oiled from both ends. The manufacturers claim that the cutter always presents the same cutting surface until it is used up to the hub, and that the handle is strong and durable.

The Government of Venezuela has placed an order with E. T. Copeland & Co., 106 Liberty street, New York, for the construction of four steam vessels for coasting service. Two are to be 75 feet long by 14 feet beam and two 65 feet long



Model Lawn Sweeper.

forced up until such resistance is passed, when it assumes its normal position. The litter is swept over a thin steel shoe behind the brush and into the basket. A special shoe is furnished for gathering leaves out of tall grass. The manufacturers claim that nothing is more injurious to lawns than to allow the clippings to remain, as decomposition of the cut grass produces an unnatural heat which stifles the growth of the sod. The sweeper is referred to as cleaning the lawn perfectly, leaving the surface free from all litter and the sod in a healthy condition. It is also adapted to other uses than for lawns. Attention is directed to their advertisement on page 90 of this issue. These machines are guaranteed by the manufacturers to give satisfaction.

Ice Picks.

Vanderbilt & Reynolds, 373 Broadway, New York, agents for American Enamel

York, are introducing an emery-wheel dresser, as illustrated herewith. It is de-

failure of the rice crop and depression in silk. Merchants hold their stock for better prices.

Baron Rothschild's Maxims.

It is stated that the elder Baron Rothschild had the walls of his bank placarded with the following curious maxims:

Carefully examine every detail of your business.

Be prompt in everything.
Take time to consider and then decide quickly.

Dare to go forward.
Bear troubles patiently.
Be brave in the struggle of life.
Maintain your integrity as a sacred thing.

Never tell business lies.
Make no useless acquaintances.
Never try to appear something more than you are.

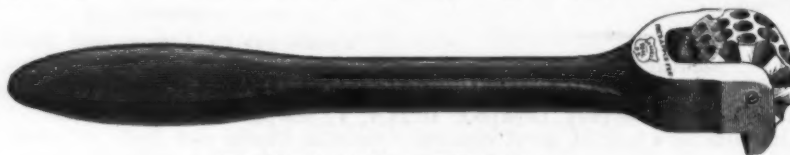
Pay your debts promptly.
Learn how to risk your money at the right moment.

Shun strong liquor.
Employ your time well.
Do not reckon upon chance.
Be polite to everybody.
Never be discouraged.

Then work hard, and you will be certain to succeed!

The Standard Emery-Wheel Dresser.

The Standard Tool Company, Cleveland, Ohio, and 33 Chambers street, New



The Standard Emery-Wheel Dresser.

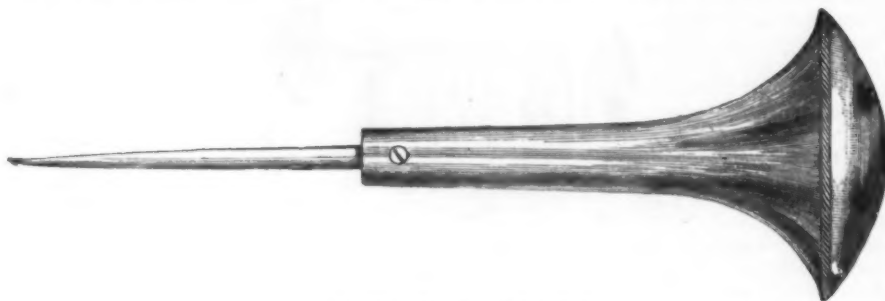


Fig. 1.—The Royal Ice Pick.

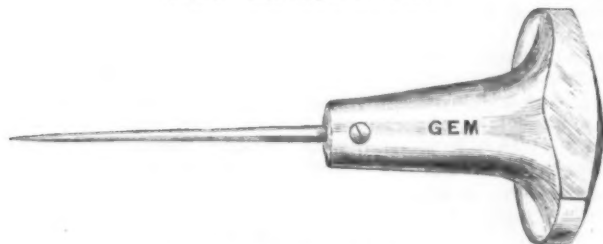


Fig. 2.—The Gem Ice Pick.

Company, Providence, R. I., are offering the trade ice picks, as illustrated herewith. Fig. 1, representing the Royal, is

signed for turning and sharpening solid or covered emery wheels, and truing even the hardest wheels and grindstones. The

Southern Pig-Iron Freights.

The Queen and Crescent route has issued Supplement No. 4 to Tariff No. 27, giving rates on pig iron effective April 11. The following are the rates to the leading points where a change has been made in Tariff No. 27, which was printed in full in *The Iron Age* of September 18, 1890:

To	From		
	Chattanooga, Tenn.	Birmingham, Ala.	Anniston, Ala. (via Attalla)
Baltimore, Md., rail and water.	..... \$4.11	.....	.....
Boston, Mass., rail and water.	..... 4.61	.....	.....
Chicago, Ill.	\$3.60	3.85	\$4.10
Indianapolis, Ind.	2.85	3.10	3.35
Jersey City, N. J., all rail.	.....	4.86	.....
Milwaukee, Wis.	4.00	4.25	4.50
New York, N. Y., rail and water.	.....	4.26	.....
Philadelphia, Pa., rail and water.	.....	4.26	.....
Wilmington, Del.	.....	4.50	.....

The Illinois Steel Company.

The question of the adjustment of wages at the Joliet Works of the Illinois Steel Company has received so much attention in the daily press for the past two months that it became a matter of general interest. It has at last been settled and the works resumed operations on April 7, with wages based on a sliding scale that has been agreed upon between the men and the management with satisfaction to both sides. Hitherto the wages settlements have been made annually at these works, entailing a stoppage of a few weeks for the negotiations. The sliding scale now adopted covers the years 1891 and 1892 and continues in force thereafter unless either side gives six months' written notice of a desire for a change.

A new cylinder is being put on the large rod-mill engine, and that department will resume operations this week or as soon as the repairs are completed.

A satisfactory settlement has also been made between the company and the blast-furnace men at Joliet. Repairs on furnaces Nos. 1 and 2, which were partially destroyed by the accident last fall, are being pushed. Furnace No. 3 will be blown in as soon as the supply of coke warrants such action.

The North Works of the company resumed operations on the 13th inst. on structural steel and other work, with a fair prospect of running for two or three months to come on orders already booked. This leaves the Union Works the only idle plant belonging to the company. When it will be started will depend upon rail orders, which are not as yet sufficiently plentiful.

The Coke Strike.

(By Telegraph.)

All indications point to an entire collapse of the coke strike in a few days. More ovens are in operation and more men are at work now than at any time since the sliding scale was presented. The workmen have been defeated after a fight of ten weeks.

NEW PUBLICATIONS.

GUIDE FRAMING OF GAS HOLDERS. By F Southwell Cripps. Size, 6 x 8 inches; 119 pages. Published by Walter King.

This book contains an article on "Guide Framing of Gas Holders," and other papers relating to strains in structures connected with gas works, the papers being reprinted from the *Journal of Gas Lighting*, after having been revised and corrected and added to. For the gas engineer the book will prove of much value, as it is a very careful treatise on the engineering problems involved in the building of gas holders. The author has not gone into the elementary problems and definitions of terms, for the work was not intended as a general treatise for the beginner, but rather as a text book for the advanced practical student, or, in other words, the engineer who has had some practical experience in the branch of his profession covered by gas work engineering. The "Guide Framing of Gas Holders" occupies over 70 pages of the book. Next comes a chapter entitled "An Investigation Into the Strains Upon the Top Curbs of the Gas Holder." The remaining two chapters treat of gas-holder crowns and strains on large purifiers. The book is well illustrated with diagrams. The advanced student will be pleased with the free use of algebraic formulæ.

THE COAL TRADE. By Frederick E. Saward, Editor of *The Coal Trade Journal*. 8vo.; 117 pages; 1891.

This is an annual publication, and has reached its eighteenth number. It contains the current information for the year concerning coal production, prices, transportation and the development of new fields in the world, and especially in America. Its contents are presented in the usual concise methods of trade journalism. In tabular form they convey to the reader many details. The varying prices in different localities, the tendencies to increased production and to higher markets when this is regulated, and the discoveries of new coal tracts in comparison with the consumption, which tests the resources of long-worked deposits, make important paragraphs in this rather miscellaneous collection of articles on the subject treated.

Hugh M. Bole, machinist and engine builder, of Pittsburgh, made an assignment yesterday.

A. B. Pitkin Machinery Company, Incorporated, succeed A. B. Pitkin in the proprietorship of the Providence Machinery Agency, Providence, R. I. The new concern announce that they will carry a large line of first-class machinery, tools and supplies, and continue the business on a larger scale than heretofore.

Joshua S. Ingalls & Co., Troy, Ohio, write under recent date that they are having an excellent demand for their Craig steel, and are booking a great many orders for fall shipment.

The first locomotive passed through the Grand Trunk Railroad tunnel under the St. Clair River, making the run through the tunnel from the Canadian to the United States side and then returning, having a flat car attached to it. The run back from the United States side was at the rate of 15 miles an hour.

Smokeless powder will be manufactured at the Dupont Powder Mills in Wilmington. The new plant will be the first of its kind in the country.

Cleveland.

(By Telegraph.)

The Coke famine is being very keenly felt. The Cleveland Rolling Mill Company's blooming mills are closed to-day, and other departments will likely shut down very soon unless Coke can be procured. The amount of Coke in this city is smaller than at any time for years. The situation in the Pig-Iron market is still devoid of new features, unless it be increasing dullness.

The annual convention of the Amalgamated Association of Iron and Steel Workers will be held in Pittsburgh, commencing the first week in June. At this convention a scale of prices governing the wages in rolling mills and nail factories for the year beginning July 1, 1891, and ending June 30, 1892, will be adopted. The scale now in force is based on puddling at \$5.50 per ton on a 2-cent card. It is not expected that this will be changed in the new scale.

CONTENTS.

The Ongley Register and Safety Signal System. Illustrated	721
The Calculation of Blast-Furnace Slags.—II.	723
Railroad Lake Rates.....	724
Threading or Cutting Pipe Machine. Illus.	725
Progress of Naval Construction.....	726
Suspension Pneumatic Power Hammer. II.	726
Forgings for Big Guns	727
Punch, Shear and Bar Cutters. Illustrated.	728
Argentine Republic Exports.....	728
Circulation of Water in Steam Boilers. II.	729
Our Copper Resources.—III.	731
Coal Product of the Far West.....	732
Making Buildings Fire Proof.....	733
Magnetic Ore Separation.....	733
Apparatus for Cleaning Sheet Iron. Illus.	735
San Francisco News.....	735
The Week.....	736
Editorials:	
A Better Outlook.....	737
The Western Coal Strike	737
Excluding Emigrants	737
Statistics of Overland Trade.....	738
The Tin-Plate Question.....	738
Personal.....	739
Obituary.....	739
The Charcoal Furnaces	739
Washington News.....	740
Manufacturing: Iron and Steel, Machinery.	
Hardware, Miscellaneous.....	740-742
Trade Report: Chicago, Philadelphia, Cleveland, Detroit, Louisville, Pittsburgh, Cincinnati, St. Louis, Financial, New York, Coal Market, British Iron and Metal Markets, Metal Market, Cleveland. 742-747-761	
Hardware: Condition of Trade, Notes on Prices, Trade Items, Nail Averages, Electrical Goods to Carry in Stock, Whatcom, Wash., The Retailers' Association, Cycles, Wallace & Sons' New Catalogue, Price-Lists, Circulars, &c., Paper Letters and Figures, "My Waste Basket" Again, Giving Credit, The Tin-Plate Situation, Exports, It Is Reported—, Electric Revolving Show Stands—Illustrated, Paints and Colors, The Self-Weighing Shot Case. II. 748 757	
A Large Wire Tramway.....	757
The Hattie Ensley Record.	758
The Studebaker Wagon Works.	758
Fox Socket Caster. Illustrated.....	759
Sliding-Door Lock. Illustrated.....	759
Champion Ice Tongs. Illustrated.....	759
Combination Clamp and Drill. Illustrated.....	759
Jim's Perfect Broiler. Illustrated.....	759
Model Lawn Sweeper. Illustrated.....	760
Ice Picks. Illustrated.....	760
The Standard Emery-Wheel Dresser. Illus.	760
Baron Rothschild's Maxims.....	760
Southern Pig-Iron Freights.....	761
The Illinois Steel Company.....	761
The Coke Strike.....	76
New Publications.....	76
Current Hardware Prices.....	762-76
Current Metal Prices.....	76

CURRENT HARDWARE PRICES.

APRIL 15, 1891.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.

Domestic..... \$ dos \$3.00, 35¢
Excelior..... \$ dos \$10.00, 50¢
Washburn's Self-Locking..... 30¢

Ammunition.—

Caps, Percussion, \$ 1000—
Hicks & Goldmark's and Union Metallic
Cartridge Co. 25¢
F. L. Waterproof, 1-10's..... 34¢
E. B. Trimmed Edge, 1-10's..... 46¢
E. B. Grnd. Edge, Cent. Fire, 1-10's..... 46¢
Musket Waterproof, 1-10's..... 50¢
G. D. 23¢
B. B. Genuine Imported..... 45¢
Wiley's E. B. 57¢
Wiley's D Waterproof, Central Fire..... \$1.60

Cartridges—

Arm Fire Cartridges..... 50¢
Arm Fire Military..... 15¢
Cent. Fire, Pistol and Rifle..... 25¢
Cent. Fire, Military and Sporting..... 15¢
Blank Cartridges, except 22 and 32 cal.,
additional 10 % on above discounts..... 2¢
Blank Cartridges, 22 cal., \$1.75..... 2¢
Blank Cartridges, 32 cal., \$3.50..... 2¢
Primed Shells and Bullets..... 15¢
B. B. Caps, Round Ball, \$1.75..... 2¢
B. B. Caps, Con. Ball, Swg'd., \$2.00..... 2¢

Primers—

Berdan Primers, \$1.00..... 2¢
B. L. Caps (for Sturtevant Shells) \$1.00..... 2¢
All other Primers, \$1.20..... 2¢

Shells—

First quality 4, 8, 10 and 12 gauge..... 25¢
First quality, 14, 16 and 20 gauge (\$10
Hst.)..... 30¢
Prize..... 30¢
Star, Club, Rival and Climax brands..... 35¢
Selfbold's Comb. Shot Shells..... 15¢
Brass Shot Shells, list quality..... 60¢
Brass Shot Shells, Club, Rival, Climax..... 65¢

Shells Loaded—

Standard List, July 19, 1890..... 40¢
Wade—Price per M.
U.M.C.W.R.A.—B. E., 11 up..... 68¢
U.M.C.W.R.A.—B. E., 9&10..... 82¢
U.M.C.W.R.A.—B. E., 8..... 96¢
U.M.C.W.R.A.—B. E., 7..... \$1.10
U.M.C.W.R.A.—P. E., 11 up..... 1.15
U.M.C.W.R.A.—P. E., 9&10..... 1.50
U.M.C.W.R.A.—P. E., 8..... 1.70
U.M.C.W.R.A.—P. E., 7..... 1.80
Wiley's B. E., 11 up..... \$1.75
Wiley's P. E., 11 up..... 2.80

Anvils—

Eagle Anvil, \$ 100..... 15¢
Peter Wright's..... 11¢
Armitage's Mouse Hole..... 10¢
Armitage's Mouse Hole, Extra..... 12¢
Trenton..... 10¢
Wilkinson's..... 10¢
Moore & Barnes Mfg. Co..... 35¢
Anvil Vice and Drill—
Millers Falls Co., \$18.00..... 20¢
Cheney Anvil and Vice..... 35¢
Allen Anvil and Vice, \$3.00..... 45¢
Star..... 45¢

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Douglas Mfg. Co..... 70¢
Wm. A. Ives & Co..... 70¢
Humphreysville Mfg. Co..... 70¢
French, Swift & Co. (F. H. Beecher..... 70¢
P. S. & W. Co..... 70¢
Rockford Bit Company..... 70¢
Cook's, Douglas Mfg. Co..... 55¢
Cook's, N. H. Copper Co. 50¢
Ives' Circular Lip..... 50¢
Patent Solid Head..... 50¢
C. E. Jennings & Co., No. 10, extension
lip..... 40¢
C. E. Jennings & Co., No. 30..... 40¢
C. E. Jennings & Co., Auger Bits, set,
32¢ quaters, No. 5, 8, No. 30, \$3.50..... 30¢
Lowie Patent Single Twist..... 45¢
Russell Jennings' Augers and Bits..... 45¢
Imitation Jennings' Bits..... 60¢
Snell's Jennings Pattern..... 60¢
Fugh's Black..... 20¢
Rockford, Jennings' Pattern..... 60¢
Car Bits, P. S. & W. Co..... 60¢
Snell's Car Bits..... 60¢
L. Hommedieu Car Bits..... 15¢
Forstner Pat. Auger Bits..... 20¢
Cincinnati Bell-Hangers' Bits..... 30¢
Bit Stock Drills—
Morse Twist Drills..... 50¢
Standard..... 50¢
Cleveland..... 50¢
Syracuse, for metal..... 50¢
Syracuse, for wood (wood list) 30¢
Williams' or Holt's, for metal 50¢
Williams' or Holt's, for wood..... 40¢
Cincinnati, for wood..... 30¢
Cincinnati, for metal..... 45¢
Expansive Bits—
Clark's small, \$18; large, \$30..... 35¢
Ives' No. 4, \$ dos \$30..... 40¢
Swan's..... 40¢
Steer's, No. 1, \$20; No. 2, \$25..... 35¢
Steer's, No. 2, \$48..... 20¢
Gimlet Bits—
Common..... \$ gross \$2.75, \$3.25
Diamond..... \$ dos \$1.10..... 25¢
See..... 25¢
Double Cut, Shephardson's..... 45¢

Double Cut, Ct. Valley Mfg. Co..... 30¢
Double Cut, Hartwell's, \$ gro..... 45¢
Double Cut, Douglass..... 40¢
Double Cut, Ives..... 60¢
Hollow Augers—
Ives, Swift & Co..... 33¢
Douglass..... 33¢
Bonney's Adjustable, \$ dos \$48..... 40¢
Stearns'..... 20¢
Ives' Expansive, each \$4.50..... 60¢
Universal Expansive, each \$4.50..... 20¢
Wood's..... 25¢
Cincinnati Adjustable..... 25¢
Cincinnati Standard..... 25¢
Ship Augers and Bits—
L'Hommedieu's..... 15¢
Watrous'..... 15¢
Snell's..... 15¢
Snell's Ship Auger Pat'n Car Bits,
15¢

Awl Hafts—See Hafts, Awl

Awls, Brad Sets, &c—

Awls, Sewing, Common..... \$ gr \$1.70, 35¢
Awls, Should. Peg, \$ gr \$2.45, 40¢
Awls, Pat. Peg..... 40¢
Awls, Shouldered Brad..... 2.70
Awls, Handled Brad..... \$7.50
Awls, Handled Scratch, \$ gr, \$7.50, 35¢
Awls, Socket Scratch, \$ dos, \$1.50, 25¢
Awls, Socket Standard..... 25¢

Awl and Tool Sets—See Sets, Awl and Tool

Axes—

First quality, best brands, \$7.00 @ \$7.50
First qual., other brands..... 6.25
Second quality..... 6.00 6.50
Axle Grease—See Grease, Axle.

Axles—

No. 1, 4¢ @ 5¢, No. 2, 5¢ @ 6¢
Nos. 7 to 14..... 55¢
Nos. 15 to 18..... 47¢
Nos. 19 to 23..... 70¢
Concord Axles, loose collar..... 5¢
Concord Axles, solid collar..... 6¢
National Tubular Self-Oiling..... 35¢

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... 40¢
No. 2000, 20..... 20¢
Chatillon, \$ dos..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40¢
Chatillon Circular Balances..... 50¢

Bars—

Cross—
Cast Steel..... \$ 3 3/4
Iron, Steel Points..... \$ 3 3/4
Basins, Wash—
Standard Fiberglass, No. 1, 10¢-inch, \$2;
12-inch, \$2.25; 13 1/4-inch, \$2.75; 15-inch,
\$3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '83..... 50¢
Chatillon's No. 1..... 40¢
Chatillon's No. 2..... 50¢
Custer's..... 35¢

Beaters—

Dover..... \$ dos \$1.50
Duplex (Standard Co.)..... \$ dos \$1.25
Rival (Standard Co.)..... \$ dos \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ dos \$1.50

Bentons—

Bryant's..... \$ gro \$14.00
Double (H. & R. Mfg. Co.) \$ gro. No. 0,
\$12.00; No. 1, \$15.00; No. 2, \$38.00
Easy (H. & R. Mfg. Co.) \$ gro \$12.00
Triple (H. & R. Mfg. Co.) \$ gro \$16.50
Spiral..... \$ gro \$4.25 @ 4.50
Improved Acme (H. & R. Mfg. Co.) \$ gro \$9.00

Culinary—

Keystone, P.D. & C., Each, No. 1, \$1; No.
2, \$2..... 20¢
Bells—
Cane—
Common Wrought..... 60¢
Western..... 70¢
Kentucky, "Star"..... 20¢
Kentucky, Sargent's list..... 70¢
Dodge, Genuine Kentucky..... 70¢
Texas Star..... 50¢
Call..... 40¢
Farm Bells..... \$ 3 3/4
Steel Alloy Church and School Bells..... 40¢

Door—

Gong, Abbe's..... 30¢
Gong, Yankee..... 45¢
Gong, Barton's..... 25¢
Crane, Taylor's..... 25¢
Crane, Brooks'..... 50¢
Crane, Cone's..... 10¢
Crane, Connel's..... 20¢
Lever, Sargent's..... 60¢
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25¢
Lever, B. E. M. Co.'s..... 50¢
Pull, Brook's..... 50¢
Pull, Western..... 25¢
Electric,
Wollensak's..... 30¢
Bigelow & Dowse..... 20¢
Taylor's..... 30¢

Hand—

Light Brass..... 75¢
Extra Heavy..... 85¢
White Metal..... 60¢
Silver Chime..... 33¢
Globe Cone's Patent..... 25¢
Bellevue—
Blacksmith's..... 60¢
Molders'..... 40¢
Hand Bellows..... 40¢

Belting, Rubber—

Common Standard..... 70¢
Standard..... 60¢
Extra..... 50¢
N.Y.B. & P. Co., Carbon..... 60¢
N.Y.B. & P. Co., Diamond..... 60¢
N.Y.B. & P. Co., Para..... 40¢

Bench Stops—See Stops, Bench.

Benders, Upsetters, Tire.
Stoddard's Lightning Tire Upsetters..... 15¢
Detroit Perfected Tire Bender..... 15¢

Bits—

Auger, Gimlet, Bit Stock, Drills, &c.,
see Augers and Bits.

Bit Holders—See Holders, Bit.

Blind Adjusters—See Adjusters,
Blind.

Blind Fasteners—See Fasteners,
Blind.

Blind Staples—See Staples, Blind.

Blocks—
Ordinary Tackle, list May 20, 1889..... 60¢
Cleveland Block Co., Mal. Iron..... 50¢
Moore's Novelty, Mal. Iron..... 50¢
Sure Grip Steel Tackle Blocks..... 25¢

Boards, Stove—

Wood Lined "Crystal"..... 50¢
"Embossed"..... 50¢
"Oxidized"..... 45¢
Paper Lined Zinc..... 55¢
"Crystal"..... 55¢
"Embossed"..... 55¢
"Oxidized"..... 45¢

Bolts—

Carriage, Machine, &c.—
Com. list June 10, '84..... 75¢
Genuine Eagle, list Oct. '84..... 75¢
Phila. pattern, list Oct. '84..... 80¢
R.B. & W., old list..... 70¢
Machine, list Jan. 1, 1890..... 75¢
Bolt Ends, list Jan. 1, 1890..... 75¢

Door and Shutter—

Cast Iron Barrel, Square, &c..... 70¢
Cast Iron Shutter Bolts..... 70¢
Cast Iron Chain (Sargent's list)..... 65¢
Ives' Patent Door Bolts..... 60¢
Wrought Barrel..... 70¢
Wrought Square..... 70¢
W.R. Shutter, all Iron, Stanley's..... 60¢
W.R. Shutter, Brass Knob..... 40¢
W.R. Shutter, Sargent's list..... 60¢
W.R. Sunk Flush, Sargent's list..... 55¢
W.R. Sunk Flush, Stanley's list..... 50¢
W.R. B.K. Flush, Com'n..... 55¢

Stove and Flow—

Stove..... 60¢
Flow..... 60¢
R. B. & W. Flow..... 55¢

Tire—

Common, list Feb. 28, '83..... 65¢
Port Chester Bolt and Nut Company:
Empire, list Feb. 28, '83..... 65¢
Keystone, Philadel., list Oct. '84..... 80¢
Norway, Phila. list Oct. '84..... 75¢
American Screw Company:
Norway, Phila., list Oct. 16, '84..... 75¢
Eagle, Phila., list Oct. 16, '84..... 80¢
Philadel., list Oct. 16, '84..... 80¢
Bay State, list Feb. 28, '83..... 65¢
R.B. & W., Philadel., list Oct. 16, '84..... 65¢

Borers, Tap.

Common and Kind..... 30¢
Ives' Tap Borer..... 35¢
Enterprise Mfg. Co..... 30¢
Clark's..... 35¢

Boring Machines—See Machines, Boring.

Boxes, Wagon..... 25¢

Braces—

American Bit Brace Co.:
Nos. 10, 13, 20..... 60¢
Nos. 11, 21, 24, 27..... 70¢
Nos. 22, 25, 28..... 60¢
Nos. 13, 25, 26, 37..... 70¢
Ball Braces, net..... \$1.12 to \$1.25

Amidon's

Barker's Imp. Plain..... 75¢
Barker's Imp. Nickel..... 65¢
Ratchet..... 75¢
Eclipse Ratchet..... 60¢
Globe Jawed..... 40¢
Corner Brace..... 40¢
Universal, 8 in., \$2.10 20 in..... \$2.25
Buffalo Ball..... \$1.10 @ \$1.15

Barber's

Nos. 10 to 16..... 50¢
Nos. 30 to 33..... 60¢
Nos. 40 to 43..... 60¢
Saxton's..... 75¢
Barker's Imp. Polished..... 75¢
Barker's Imp. Nickel..... 65¢
Ratchet, Polished..... 50¢
Ratchet, Nickel..... 40¢
Buffalo Ball..... net, \$1.10 @ \$1.15

Bartholomew's

Nos. 25, 27 and 30..... 50¢
Nos. 17, 18, 119..... 70¢
Common Ball, American..... \$1.00 @ \$1.10
Fray's Genuine Spotted's..... 50¢
Fray's No. 70 to 120, 81 to 123, 207 to 414..... 60¢

Ives' New Haven Novelty

70¢
New Haven Ratchet..... 60¢
Barber Ratchet..... 60¢
Barbers..... 60¢
Spotted's..... 60¢
Oswood's Ratchet..... 40¢
P. S. & W. Co., Peck's Patent..... 60¢

Brackets—

Shelf plain, Sargent list, 55¢
Shelf, fancy, Sargent's list, 60¢
Reading, plain..... 50¢
Reading, Rosette..... 60¢

Bright Wire Goods—See Wire.

Brass—

Henry's Self-Inch..... 9 10 9x11
Basting..... \$ dos \$4.50 5.50 6.50
New Haven..... 50¢
Wire Goods Co..... 65¢

Buckets, Well.

Galvanized—
Hill's..... \$ dos, 12 qt, \$4.25; 14 qt, \$5.25
Iron Clad..... \$ dos, 14 qt, \$4.25 @ \$4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ dos \$4.00

Bull Rings—See Rings, Bull.

Butchers' Cleavers—See Cleavers Butchers'.

Butts—

Brass—
Wrought Brass..... 75¢
Cast Brass, Tiebout's..... 50¢
Cast Brass, Corbin's, Fast..... 33¢
Cast Brass, Loose Joint..... 33¢

Cast Iron—

Fast Joint, Narrow..... 50¢
Fast Joint, Broad..... 50¢
Loose Joint..... 50¢
Loose Joint, Japanned..... 70¢
Parliament Butts, with Acorns..... 70¢
Mayer's Hinges..... 70¢
Loose Pin, Acorns..... 70¢
Loose Pin, Acorns, Japanned..... 70¢
Plated Tips..... 70¢

Wrought Steel—

Fast Joint, Narrow..... 70¢
Fast Joint, Lt. Narrow..... 70¢
Fast Joint, Broad..... 70¢
Loose Joint, Broad..... 70¢
Inside Butts, Back Flaps, &c..... 70¢
Inside Blind, Regular..... 70¢
Inside Blind, Light..... 70¢
Loose Pin..... 70¢
Bronzed Wrought Butts..... 50¢

Callipers—See Compasses.

Calks, Tee—

Gantier, One Prong, Blunt..... 5¢
Burke's, One Prong, Blunt..... 5¢
Burke's, Two Prong, Blunt..... 7¢
Burke's, One Prong, Sharp..... 6¢

Can Openers—See Openers, Can.

Cards—List January 28, 1891.

Watson's Cotton, Wool, Horse and
File..... 25¢

Carpet Stretchers—See Stretchers
Carpet.

Carpet Sweepers—See Sweepers
Carpet.

Cartridges—See Ammunition.

Casters—

Bed..... \$ 55 @ 55¢
Plate..... \$ 60 @ 60¢
Shallow Sockets..... 40¢
Deep Sockets..... 40¢
Yale Casters, list May, 1884..... 30¢
Yale, Gem..... 60¢
Martin's Patent (Phoenix)..... 45¢
Payson's Anti-Friction..... 60¢
Giant Truck Casters..... 40¢
Stationary Truck Casters..... 50¢
Socket Truck Casters..... 60¢

Cattle Leaders—See Leaders, Cattle.

Cement.

Victor Elastic..... 5 b pails \$ 5

Chain—

Trace, Wagon and Fancy Chains,
List revised April 21, 1890..... 50¢

American Coil, in cask lots,
3-15 1/2 5-10 7-16 1/2 1/2 1/2
\$7.75 5.45 4.55 4.00 3.65 3.50 3.10 3.30
Less than cask lots, add 1/4¢ per lb.
German Coil, list Oct. 6, 1890..... 60¢
German Halter Chain, list Oct. 6, 1890..... 60¢

Covert Halter..... 60¢
Covert Trace..... 35¢
Covert Heel Chain..... 50¢
Onside Halter Chain..... 60¢
Galvanized Pump Chain..... 75¢
Jack Chain, Iron..... 75¢
Jack Chain, Brass..... 75¢

Chalk—

White..... \$ gr 50¢
Red..... \$ gr 70¢
Blue..... \$ gr 85¢
See also Crayons.

Chalk Lines—See Lines.

Chisels—

Socket Framing and Firmer.
P. S. & W..... 75¢
New Haven..... 75¢
Witherby..... 75¢
Mix..... 75¢
Ohio Tool Co..... 75¢

Douglas..... 75¢
Buck Bros..... 75¢
Merrill..... 75¢
L. & J. White..... 75¢

Tanged and Miscellaneous..... 40¢
Butchers'..... \$4.75 @ \$5.00
Spear & Jackson's..... \$5 to \$6
Buck Bros..... 80¢
Cold Chisels..... 15¢

Chucks-

Beach Pat.	each, \$8.00	20%
Morse's Adjustable, each	\$7.00, 20¢	20%
Danbury	each, \$6.00, 30¢	30%
Syracuse, Ball Pat.	.....	33%
Graham Patent	.....	33%
Skinner's Patent Chucks	.....	33%
Combination Lathe Chucks	.....	33%
Universal Lathe Chucks	.....	40%
Independent Lathe Chucks	.....	40%
Drill Chucks	.....	40%
Union Mfg. Co.	.....	40%
Victor	.....	40%
Combination	.....	40%
Universal	.....	40%
Independent	.....	40%

Churns.

Timin Union, each, 5 gal.	\$3.25; 7 gal., \$3.75; 10 gal., \$4.25.
McDermid Star Barrel Churn, each,	6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25.

Clamps-

R. I. Tool Co.'s Wrought Iron	.....	25%
Adjustable, Cincinnati	.....	15%
Adjustable, Hammer	.....	15%
Adjustable, Stearn's	.....	30%
Stearn's Adjustable Cabinet and Corner	.....	30%
Cabinet, Sargent's	.....	60%
Carriage Makers', Sargent's	.....	70%
Carriage Makers', P. S. & W. Co.	.....	40%
Eberhard Mfg. Co.	.....	40%
Parallel, C. H. Bosley & Co.	.....	40%
Warner's	.....	40%
Saw Clamps, see Vices, Saw Filers.	.....
Carpenters', Cincinnati	.....	25%

Cleavers.

Butchers'	.....	25%
Bradley's	.....	25%
L. & J. White	.....	40%
Beatty's	.....	40%
New Haven Edge Tool Co.	.....	40%
P. S. & W.	.....	35%
Poster Bros.	.....	30%
Schulte, Lohoff & Co.	.....	40%

Clips-

Norway, Axle, 1/4 & 5-16	.....	55%
2nd grade Norway Axle, 1/4 & 5-16	.....	55%
Superior Axle Clips	.....	60%
Norway Spring Bar Clips, 5-16	.....	40%
Wrought-Iron Felloe Clips	.....	50%
Steel Felloe Clips	.....	50%
Baker Axle Clips	.....	55%

Cloth and Netting, Wire-See Wire, &c.

Cocks.

Cocks, Brass.

Hardware List.

Coffee Mills-See Mills, Coffee.

Collars, Dog, &c.

Medford Fancy Goods Co.

Embossed, Gift, Pope & Steven's List

Leather, Pope & Steven's List

Brass, Pope & Steven's List

Chapman Mfg. Company

Combs, Curry.

Fitch's

Rubber, per doz \$10.00

Perfect

Compasses, Dividers, &c.-

Compasses, Callipers, Dividers

Bemis & Call Co.'s

Dividers

Compasses & Callipers

Wing and Inside or Outside

Double

(Call's Pat. Inside)

Excelsior

J. Stevens & Co.'s

Starr's

Spring Callipers and Dividers

Lock Callipers and Dividers

Combination Dividers

Coopers' Tools-See Tools, Coopers'.

Cord-

Sash.

Common

Patent, good quality

White Cotton Braided, fair

Common Russia Sash

Patent

Cable Laid Italian Sash

Indian Cable Laid

Silver Lake

A Quality, White, 50¢

A Quality, Drab, 50¢

B Quality, White, 50¢

B Quality, Drab, 50¢

C Quality, White (only)

Sylvan Spring, Extra Braided, White, 24¢

Sylvan Spring, Extra Braided, Drab, 24¢

Memper Idem, Braided, White, 30¢

Egyptian, India Hemp, Braided, 25¢

Bamboo

Braided, White Cotton, 50¢

Braided, Drab Cotton, 50¢

Braided, Italian Hemp, 50¢

Braided, Linen, 80¢

Fate & Co. Braided Wire, 100 ft., 51¢

Wire Picture

Braided or Twisted

Corkscrews-See Screws, Cork.

Corn Knives and Cutters-See Knives, Corn.

Crackers, Nut-

Table (H. & B. Mfg. Co.)

Blake's Patent

Turner & Seymour Mfg. Co.

Cradles-

Grain

White Crayons

D. M. Stewart Mfg. Co., Metal Work-

Cutters-

Meat.	.....
Dixon's	.....	40%
Nos. 1, 2, 3, 4	.....
.....	\$14.00 \$17.00 \$19.00 \$20.00	

Woodruff's

Hales Pattern

American

Enterprise

Great American Meat Cutter

Miles' Challenge

Home No. 1

Draw Cut, each

Great American

Beef Shavers (Enterprise)

Little Giant

Chadborn's Smoked Beef Cutter

Tobacco

Champion

Wood Bottom

All Iron

Nashua Lock Co.'s

Wilson's

Sargent's

Acme

Smith's Pat.

Johnson's

Penny's

Appleton's

Bonney's

Cincinnati

Cutlery-

Pocket and Table

Wostenholm

Dampers, &c-

Dampers, Buffalo

Buffalo Damper Clips

Crown Damper

Excelsior

Diggers, Post Hole, &c-

Samson Post Hole Digger

Fletcher Post Hole Augers

Eureka Diggers

Leed's

Vaughan's Post Hole Auger

Kohler's Little Giant

Kohler's Hercules

Kohler's New Champion

Schneider

Ryan's Post Hole Diggers

Cronk's Post Bars

Gibbs Post Hole Digger

Imperial

Dividers-

See Compasses.

Dog Collars-See Collars, Dog, &c.

Door Springs-See Springs, Door.

Drawers.

Money, per doz

Drawing Knives-See Knives, Drawing.

Drills and Drill Stocks-

Blacksmiths'

Blacksmiths' Self-Feeding

Breast, P. S. & W.

Breast, Wilson's

Breast, Millers' Falls

Breast, Bartholomew's

Ratchet, Merrill's

Ratchet, Ingersoll's

Ratchet, Parker's

Ratchet, Whitney's

Ratchet, Weston's

Ratchet, Moore's Triple Action

Ratchet, Curtis & Curtis

Whitney's Hand Drill, Plain

Adjustable

Wilson's Drill Stocks

Automatic Boring Tools

Morse

Standard

Syracuse (Metal List)

Cleveland

Williams

New Process

Graham's Pat. Groove Shank

Drill Bits-See Augers and Bits.

Drill Chucks-See Chucks.

Dripping Pans-See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.

Disston's

Bruck Bros.

Stanley R. & L. Co.'s

Varnished Handles

Screw-Drive Bits, Parr's	.....	50%
Fray's Hol. Hdlie. Sets, No. 3	.....	50%
P. D. & Co.'s all Steel	.....	50%
Cincinnati	.....	50%
Brace Screw Drivers	.....	50%
Bruck Bros' Screw-Drive Bits	.....	50%

Egg Beaters-See Beaters, Egg.

Egg Poachers-See Poachers, Egg.

Electric Bell Sets-See Bells, Elec-

tric.

Emery - No. 4 to No. 54 to Flour, CF

Kegs, 40 gr.

1/2 kegs, 100 gr.

1/4 kegs, 250 gr.

10-lb cans, 10

In case, less

than 10-lb cans, 10

Emery and Tinned Ware-See Ware, Hollow.

Escutcheon Pins-See Pins, Escutcheon.

Escutcheons.

Door Lock - Same dis as Door Locks.

Brass Thread

Wood

Expanded Metal.

List No. 5.

Lathing

Fencing, Painted Sheets

Netting, Painted Sheets

Door Mats, Galvanized

Window Guards, Paneled

Tree Guards, Paneled

Fasteners, Blind-

Mackrell's

Van Sand's Screw Pat.

Van Sand's Old Pat.

Washburn's Old Pattern

Merriman's

Austin & Eddy No. 2006

Security Gravity

Faucets-

Fenn's

Bohren's Pat. Rubber Ball

Fenn's Cork Stops

Fraser's Pat. Petroleum

B. & L. B. Co.

West's Lock, Open and Shut Key

Star Metal Plug, new list

Lockport, Metal Plug, reduced list

Metallic Key, Leather Lined

Cork Lined

Burnside's Red Cedar

Burnside's Red Cedar, bbl lots

John Sommers'

Peerless Best Block Tin Key

IXL, 1st quality, Cork Lined

Diamond Lock

Perfection, Fla. Red Cedar

Roggin's Latches..... \$ doz 30¢ to 35¢
 Bronze Iron Drop Latches... \$ doz 70¢ net
 Jap'd Store Door Handles—Nuts, \$1.52;
 Plate, \$1.10; no Plate, \$0.88..... net
 Barn Door, \$ doz \$1.40..... 10¢ to 15¢
 Chest and Lifting..... 70¢

Wood—

Saw and Plane..... 40¢ to 10¢ to 40¢ to 10¢
 Hammer, Hatchet, Axe, Sledge, &c..... 40¢
 Brad A.W.I..... \$ gr 22.00
 Hickory Firmer Chisel, ass'd..... \$ gr 4.50
 Hickory Firmer Chisel, large..... \$ gr 5.00
 Apple Firmer Chisel, ass'd..... \$ gr 5.00
 Apple Firmer Chisel, large..... \$ gr 6.00
 Socket Firmer Chisel, ass'd..... \$ gr 5.00
 Socket Framing Chisel, ass'd..... \$ gr 5.00
 I. S. Smith & Co.'s Pat File..... 50¢
 File, assorted..... \$ gr 7.75
 Auger, assorted..... \$ gr 5.00..... 50¢
 Auger, large..... \$ gr 7.00..... 50¢
 Pat. Auger, Ives..... 30¢ to 10¢
 Pat. Auger, Douglass..... \$ set \$1.22
 Pat. Auger, Swan's..... \$ set \$1.00
 Hoe, Rake, Shovel, &c..... 50¢ to 10¢

Hangers—

Barn Door, old patterns..... 60¢ to 10¢ to 70¢
 Barn Door, New England..... 30¢ to 10¢ to 70¢
 Samson Steel Anti-Friction..... 55¢
 Orleans Steel..... 55¢
 Hamilton Wrought Wood Track..... 55¢
 U. S. Wood Track..... 55¢
 Champion..... 55¢
 Rider and Wooster, Medina Mfg. Co.'s
 Pat..... 70¢
 Climax Anti-Friction..... 55¢
 Climax Anti-Friction for Wood Tracks..... 55¢
 Zenith for Wood Track..... 55¢
 Reed's Steel Arm..... 50¢
 Challenge, Barn Door..... 50¢
 Sterling..... 30¢ to 10¢
 Victor, No. 1, \$16.00; No. 2, \$10.00; No. 3, \$18.00..... 50¢ to 25¢
 Cheritree..... 50¢ to 10¢
 Kipper's..... 50¢ to 10¢ to 60¢
 The Boss..... 60¢ to 10¢
 Best Anti-Friction..... 60¢ to 10¢
 Duplex (Wood Track)..... 60¢ to 10¢
 Terry's Pat., \$ doz pr. 4 in., \$10.00; 5 in., \$12.00..... 50¢ to 10¢
 Terry's Steel Anti-Friction Leader..... 50¢ to 10¢
 Terry's Steel Anti-Friction Ideal..... 50¢ to 10¢
 Cronk's Patent, Steel Covered..... 50¢ to 10¢
 Wood Track Iron Clad, \$ ft. 10¢..... 50¢ to 10¢

Carrier Steel Anti-Friction..... 50¢ to 10¢
 Architect, \$ set \$6.00..... 20¢
 Helipse..... 30¢ to 10¢
 Felix, \$ set \$4.50..... 20¢
 Richards..... 30¢ to 10¢ to 10¢
 Lane's Standard..... 50¢ to 10¢ to 10¢
 Lane's New Standard..... 50¢ to 10¢ to 10¢
 Ball Bearing Door Hanger..... 20¢ to 10¢ to 10¢
 Warner's Pat..... 20¢ to 10¢ to 10¢ to 10¢
 Stearns' Anti-Friction..... 20¢ to 10¢ to 10¢ to 10¢
 Stearns' Challenge..... 25¢ to 10¢ to 10¢ to 10¢
 Facilities..... 40¢ to 10¢ to 10¢
 American, \$ set \$6.00..... 20¢
 Rider & Wooster, No. 2, \$10.00; No. 3, \$12.00..... 40¢
 Paragon, Nos. 1, 2 and 3..... 40¢ to 10¢
 Cincinnati..... 25¢ to 10¢
 Paragon, Nos. 5, 6, 7 and 8..... 20¢ to 10¢
 Crescent..... 60¢ to 10¢ to 10¢
 Nickel Cast Iron and Steel..... 40¢
 Nickel, Malleable..... 40¢
 Scranton Anti-Friction Single Strap..... 30¢
 Wild West, 4 in. Wheel, \$15.00; 5 in. Wheel, \$21.00..... 45¢
 Star..... 40¢ to 10¢ to 10¢ to 10¢
 May..... 50¢ to 10¢ to 10¢ to 10¢
 Barry, \$6.00..... 40¢ to 10¢
 Interstate..... 50¢
 Magic..... 40¢

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.
 Blood's.....
 Hunt's.....
 Hurd's.....
 Mann's.....
 Peck's.....
 Underhill's..... 40 & 10
 Buffalo Hammer Co.....
 Fayette R. Plumb..... 50 & 5
 C. Hammond & Son.....
 Kelly's.....
 Sargent & Co.....
 P. S. & W. Co.....
 Ten Eyck Edge Tool Co.....
 Collins..... 10¢
 Schulte, Lohoff & Co..... 50¢ to 10¢ to 10¢

Hay and Straw Knives—See

Knives.

Hinges—

Blind Hinges—
 Parker..... 75¢ to 25¢
 Palmer..... 50¢ to 10¢ to 10¢
 Seymour..... 70¢ to 25¢
 Huffer..... 50¢
 Clark's, Nos. 1, 3, 5, 40 and 60..... 75¢ to 10¢ to 50¢
 Clark's Mortise Gravity..... 75¢ to 10¢ to 50¢
 Sargent's, Nos. 1, 3, 5, 11, 13..... 75¢ to 10¢ to 50¢
 Sargent's, No. 12..... 75¢ to 10¢ to 50¢
 Reading's Gravity..... 75¢ to 10¢ to 50¢
 Shepard's.....
 Noiseless..... 75¢ to 10¢
 Niagara..... 80¢
 Buffalo..... 80¢
 Clark's Genuine Pattern..... 80¢
 O. S. Lull & Porter..... 75¢ to 10¢
 Acme, Lull & Porter..... 75¢
 Queen City Reversible..... 70¢ to 10¢ to 75¢
 Clark's Lull & Porter, Nos. 0, 1, 14, 2, 24, 5, 50..... 75¢ to 10¢ to 25¢
 4th's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50..... 10¢

Gate Hinges—

Western..... \$ doz \$4.40, 60¢
 N. E. Reversible..... \$ doz \$7.00, 55¢
 N. E. Reversible..... \$ doz \$5.20, 55¢ to 10¢
 Clark's, Nos. 1, 2, 3..... 60¢ to 10¢ to 5¢
 Y. State..... \$ doz \$5.00, 55¢ to 10¢
 Automatic..... \$ doz \$12.50, 50¢
 Common Sense..... \$ doz pair \$4.50, 50¢
 Seymour's..... 45¢ to 10¢
 Shepard's..... 60¢ to 10¢ to 5¢
 Reed's Latch and Hinges..... \$ doz \$12.00, 60¢

Spring Hinges—

Union Spring and Blank Butts..... 40¢
 Year's Spring Hinge Co.'s list, March 1890..... 30¢

Acme..... 30¢
 J. S. Salomander Irons..... 25¢
 Empire and Crown..... 20¢
 Amero and Monarch..... 55¢
 American, Gem, and Star..... 50¢
 Oxford..... 30¢
 Barker's Double Acting..... 25¢
 Union Mfg. Co..... 25¢
 Bommer's..... 30¢
 Buckman's..... 15¢ to 20¢
 Chicago..... 30¢
 Wiles'..... 40¢
 Devore's..... 40¢
 Rex..... 40¢
 Royal..... 60¢
 Reliable..... 60¢
 Champion..... 60¢
 Hardsley's Patent..... 40¢
 Stearns..... 50¢ to 10¢
 Niagara, Holdback pattern, per gross..... \$14.00

Wrought Iron Hinges

List February 14, 1891.
 Strap and T..... 50¢ to 10¢
 Corrugated Strap and T..... 50 & 10
 Screw Hook and (6 to 12 in., \$ 4¢
 Strap..... 14 to 20 in., \$ 3¢ to 4¢
 (22 to 30 in., \$ 4¢ to 5¢
 (34 in., \$ 5¢ to 6¢
 Screw Hook and Eye..... 14 in., \$ 5¢ to 6¢
 (34 in., \$ 4¢ to 5¢
 Rolled Blind Hinges, Nos. 32 and 34..... 50¢ to 10¢
 Rolled Blind Hinges, Nos. 232 and 234..... 55¢ to 10¢
 Rolled Plate..... 70¢ to 10¢
 Plate Raised..... 70¢ to 10¢
 Plate Hinges (8, 10 & 12 in., \$ 5¢
 "Providence" over 12 in., \$ 5¢ to 6¢

Hoes—

Eye—
 D. & H. Scovill..... 20¢
 Lane's Crescent Planters Pattern..... 45¢ to 55¢
 Lane's Razor Blade, Scovill Pattern..... 30¢
 Maynard, S. & O. Pat..... 45¢ to 55¢
 Sandusky Tool Co., S. & O. Pat..... 50¢ to 10¢ to 5¢
 Am. Axe and Tool Co., S. & O. Pat..... 60¢
 Chattanooga Tool Co., S. & O. Pat..... 50¢ to 10¢ to 5¢
 Grub..... 50¢ to 10¢

Handled—

Garden, Mortar, &c..... 65¢ to 5¢ to 10¢
 Planter's, Cotton &c..... 55¢ to 65¢ to 10¢
 Warren Hoe..... 60¢
 Magic..... \$ doz \$4.00

Hog Rings and Ringers—See

Rings and Ringers.

Holding Apparatus—See

Machines, Holding.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag—
 Sprengle's Pat..... \$ doz \$18..... 60¢
 Bit—
 Extension.....
 Barber's, \$ doz \$15.00..... 40¢ to 10¢ to 10¢
 Ives, \$ doz \$20.00..... 60¢ to 5¢ to 10¢ to 10¢
 Diagonal..... \$ doz \$24.00, 40¢ to 5¢
 Angular..... \$ doz \$24.00, 40¢ to 5¢

File and Tool—

Bals Pat..... \$ doz \$4.00, 25¢
 Nicholson File Holders..... 20¢
 Dick's Tool Holder..... 30¢

Hooks—

Cast Iron—
 Bird Cage, Sargent's list..... } 60¢ to 10¢ to 10¢
 Bird Cage, Reading..... } 60¢ to 10¢ to 10¢
 Clothes Line, Sargent's list..... } 60¢ to 10¢ to 10¢
 Clothes Line, Reading..... } 60¢ to 10¢ to 10¢
 Ceiling Sargent's list..... 55¢ to 10¢ to 10¢
 Harness, Reading list..... 55¢ to 10¢ to 10¢ to 10¢
 Coat and Hat, Sargent's list..... 55¢ to 10¢ to 10¢ to 10¢
 Coat and Hat, Reading..... 50¢ to 10¢ to 10¢ to 10¢
 Wrought Iron—
 Cotton..... \$ doz \$1.25
 Cotton Pat. (N.Y. Mallet & Handle Wks.)..... 30¢
 Tassel and Picture (T. & S. Mfg. Co.)..... 50¢
 Wrought Staples, Hooks, &c..... See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1888..... 60¢
 Wire Coat and Hat, Miles', list April, 1888..... 50¢
 Indestructible Coat and Hat..... 45¢
 Wire Coat and Hat, Standard..... 60¢
 Handy Hat and Coat..... 50¢ to 10¢
 Steady Ceiling Hooks..... 30¢ to 10¢ to 10¢
 Atlas, Coat and Hat..... 60¢

Miscellaneous.

Grass, No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50
 Nolin's Grass..... \$ doz \$2.25
 Bush..... 55¢ to 60¢
 Whiffletree—Patent..... 55¢
 Hooks and Eyes—Malleable Iron..... 70¢ to 10¢ to 10¢
 Hooks and Eyes—Brass..... 60¢ to 10¢ to 10¢
 Bench Hooks..... See Bench Stays.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

House Rubber—

Competition..... 75¢ to 75¢ to 55¢
 Standard..... 60¢ to 10¢ to 60¢ to 10¢ to 10¢
 Extra..... 40¢ to 10¢ to 60¢
 N. Y. B. & P. Co., Para..... 25¢ to 5¢
 N. Y. B. & P. Co., Extra..... 40¢ to 10¢ to 5¢
 N. Y. B. & P. Co., Dundee..... 40¢ to 10¢ to 60¢

Huskers—

Blair's Adjustable..... \$ gr \$8.00
 Blair's Adjustable Clipper..... \$ gr 7.00
 Hubbard's Solid Steel..... \$ gr 4.50

Indurated Fiber-Ware—See

Ware, Indurated Fiber.—

Irons.

Sad—
 From 4 to 10, at factory..... \$ 100 2¢, \$2.30 to \$2.40
 Self-Heating..... \$ doz \$9.00 net
 Self-Heating, Tailors'..... \$ doz \$18.00 net
 Mrs. Pott's Irons..... 50¢ to 5¢
 Enterprise Star Irons..... 50¢ to 5¢
 XX Cold Handle Sad Irons..... 50¢ to 5¢

Ideal Irons new list..... 50¢ to 10¢ to 60¢ to 10¢ to 10¢
 Salamander Irons..... 25¢
 B. B. Sad Irons..... \$ 3 @ 34¢
 Combined Fluter and Sad Iron, \$ doz..... 15¢
 Fox Reversible, Self-Fluter \$ doz \$24.00
 Chinese Laundry (N.E. Butt Co.) \$ doz..... 15¢
 New England..... 5¢, 15¢
 Mahony's Troy Pol. Irons..... 25¢
 Sensible, list Jan. 91..... 50¢ to 10¢ to 5¢
 Sensible Tailor's Irons..... 33¢ to 5¢
 National Self-Heating..... 80¢

Soldering—

Soldering Coppers..... \$ doz 22¢ to 23¢
 Covert's Adjustable, list Jan. 1, 1886..... 35¢ to 25¢

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy..... 33¢ to 45¢
 Victor..... 33¢ to 45¢

Knives—

Brass, Spun, Plain, list Jan. 1, '91..... 5¢ to 5¢
 Brass, Spun, Plain, W.M. list Jan. 1, '91..... 20¢
 Enamelled and Tea-See Hollow Ware.

Keys—

Lock Ass'n list Dec. 30, 1889..... 50¢ to 10¢ to 60¢ to 5¢
 Eagle, Cabinet, &c..... 33¢ to 25¢
 Hotchkiss' Brass Blanks..... 40¢
 Hotchkiss, Copper and Tinned..... 40¢
 Hotchkiss, Pat. and Cab..... 35¢
 Ratchet Red Key..... \$ doz \$4.00, 15¢
 Wollensak Tinned..... 50¢ to 10¢

Knife Sharpeners—See Sharpeners.

Knives.

Butcher, Shoe, &c—
 Wilson's Butcher Knives, list Dec 8, 1889..... 25¢
 Ames' Butcher Knives..... 25¢
 Foster Bros' Butcher, &c..... 40¢
 Jordan's AAA, Butchers', list..... net
 Nichols' Butcher Knives..... 40¢ to 10¢
 W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.80, &c..... 20¢ to 25¢
 Ames' Bread Knives, \$ doz \$1.50, 15¢ to 20¢
 Moran's Shoe and Bread..... 20¢
 Hay and Straw..... See Hay Knives.

Table and Pocket—See Cutlery.

Corn, Auburn Mfg. Co. Crescent..... \$2.00

Corn, Auburn Mfg. Co. Crescent..... \$3.50

Bradley's..... 10¢

Wadsworth's..... 25¢

Draining—

Witherby..... } 75¢ to 10¢ to 10¢

P. S. & W..... } 75¢ to 10¢ to 10¢

Merrill..... 60¢ to 10¢ to 60¢ to 10¢ to 5¢

Douglas..... 75¢ to 75¢ to 5¢

Watrous..... 15¢ to 10¢ to 25¢

L. & I. J. White..... 20¢ to 5¢

Bradley's..... 35¢

Adjustable..... 35¢ to 25¢

Wilkinson's Folding..... 25¢ to 25¢ to 5¢

Hay and Straw—

Lightning, Mfrs. price \$ doz \$18.00, 25¢

But jobbers cut this price freely, often selling at \$8 & \$8.50.

Wadsworth's..... 40¢ to 7¢ to 40¢ to 10¢

Carter's Needle..... \$ doz \$11.00, \$12.50

Auburn Hay, Corn and Spear Point..... 50¢

Auburn, Straw..... 40¢

Nolin's Hay..... \$ doz \$7.00 @ \$8.00

Mining.

Am. (3d quality), \$ gr. 1 blade, \$7;

2 blades, \$12; 3 blades, \$18..... net

Lancroft's..... 20¢ to 10¢

Smith's, \$ doz, Single, \$2.00; Double, \$3..... 40¢ to 45¢

Knapp & Cowles..... 50¢ to 10¢ to 60¢

Buffalo Adjustable..... \$ doz \$3.00, 25¢

Buffalo Double Adjustable..... \$ doz \$3.00, 25¢

Knobs—

Door Mineral..... 60¢ to 65¢

Door Por. Jap'd..... 70¢ to 75¢

Door Por. Nickel..... \$2.00 to 2.25

Door Por. Plated, Nickel..... \$2.00 to 2.25

Drawer, Porcelain..... 60¢ to 10¢ to 60¢ to 10¢ to 10¢

Hemacite Door Knobs..... 40¢ to 10¢ to 50¢

Yale & Towne Wood, list Dec. 1885..... 40¢

Furniture, Plain..... 75¢ gro inch, 10¢

Furniture, Wood Screws..... 25¢ to 10¢

Base, Rubber Tip..... 70¢ to 10¢ to 5¢

Picture, Judd's..... 60¢ to 10¢ to 70¢

Picture, Sargent's..... 70¢ to 10¢

Picture, Hemacite..... 35¢ to 5¢

Shutter, Porcelain..... 65¢ to 10¢

Carriage, Jap'd..... \$ gro 80¢, 60¢ to 10¢

Bardsley's Wood Door, Shutter, &c..... 40¢

Ladies—

Melting, Sargent's..... 55¢ to 10¢

Melting, Reading..... 35¢ to 10¢

Melting, Monroe's Pat..... \$ doz \$4.00, 40¢

Melting, P. S. & W..... 35¢ to 10¢ to 40¢

Melting, Warner's..... 30¢

Lanterns—

Tubular—

Plain with Guards, \$ doz..... \$3.75

Lift Wire, with Guards..... \$4.00

Square Plain, with Guards..... \$3.75

Sq. Lift Wire, with Guards..... \$4.50

Without Guards, 25¢ \$ doz less.

Police Lanterns (including packages).

2½-inch Bull's-eye Police regular..... \$ doz \$3.00

3-inch Bull's-eye Police regular..... \$ doz \$3.90

2½-inch Bull's-eye Police flash light..... \$ doz \$4.00

3-inch Bull's-eye Police flash light..... \$ doz \$4.50

Lawn Mowers—See Mowers, Lawn.

Leaders, Cattle.

Humason, Beckley & Co.'s..... 70¢

Hotchkiss..... 60¢ to 10¢ to 10¢

Peck, Stow & W. Co..... 60¢ to 10¢

Lemon Squeezers—See Squeezers, Lemon.

Lifters, Trausom.

Wollensak's:

Class 3 and 4, Bronzed Iron..... 50¢

Class 3 and 4, Bronze Metal..... 25¢

Class 3 and 4, Brass..... 35¢

Skylight Lifters..... 50¢

Crown, Eagle and Shield..... 50¢

Reiber's, list Feb. 20, 1891..... 50¢ to 10¢ to 10¢

Bronzed Iron Rods..... 50¢ to 10¢ to 10¢

Brass, Real Bronze or Nickel Plate 30¢

Excelsior..... 50¢ to 10¢ to 5¢
 Shaw's..... 50¢ to 10¢
 Payson's..... 60¢
 Universal..... 60¢
 Solid Grip..... 60¢
 Imperial..... 50¢ to 10¢

Lines—

Cotton and Linen Fish, Draper's..... 60¢
 Draper's and Tate's Chalk..... 60¢
 Draper's Mason's Linen, 54 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25..... 25¢
 Cotton Chalk..... 25¢
 Samson, Cotton, No. 4, \$2; No. 4½, \$2.50; 10¢

Silver Lake, Braided, No. 1, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50; No. 4, \$8.00; No. 4½, \$8.50; No. 5, \$9.00; No. 5½, \$9.50; No. 6, \$10.00; No. 6½, \$10.50; No. 7, \$11.00; No. 7½, \$11.50; No. 8, \$12.00; No. 8½, \$12.50; No. 9, \$13.00; No. 9½, \$13.50; No. 10, \$14.00; No. 10½, \$14.50; No. 11, \$15.00; No. 11½, \$15.50; No. 12, \$16.00; No. 12½, \$16.50; No. 13, \$17.00; No. 13½, \$17.50; No. 14, \$18.00; No. 14½, \$18.50; No. 15, \$19.00; No. 15½, \$19.50; No. 16, \$20.00; No. 16½, \$20.50; No. 17, \$21.00; No. 17½, \$21.50; No. 18, \$22.00; No. 18½, \$22.50; No. 19, \$23.00; No. 19½, \$23.50; No. 20

Shepard Hand Fluter, No. 110 # doz \$11.00.....40%
Shepard Hand Fluter, No. 95 # doz \$8.00.....40%
Clark's Hand Fluter, # doz \$15.00.....35%
Combined Fluter and Sad Iron, # doz \$15.00.....30%
Buffalo # doz \$10.00.....10%

Hoisting—
Moore's Hand Hoist, with Lock # doz \$15.00.....30%
Moore's Differential Pulley Block, # doz \$15.00.....30%
Energy Mfg. Co's, # doz \$15.00.....30%
Sure Grip Steel Tackle Blocks.....25%

Washing—
Anthony Wayne, # doz No. 1, #51; No. 2, #45; No. 3, #42

Mallets.
Hickory.....20¢10¢20¢10¢10¢
Lignumvite.....20¢10¢20¢10¢10¢
B. & L. Block Co., Hickory & L. V. 30¢30¢10¢

Mattocks. Regular list. 60¢10¢60¢10¢5%

Measures—
Standard Fiberware, No. 1, peck, # dozen, #4; #4-peck, \$3.50.

Meat Cutters—See Cutters, Meat.

Mills.

Coffee—
Box and Side, List Jan. 1, 1888.....60¢2%
American, Enterprise Mfg Co. 30¢10¢30%
The Swift, Lane Bros.....30¢10%

Mining Knives—See Knives,

Mining.

Melasses Gates—See Gates, Mo-

lasses.

Money Drawers—See Drawers,

Money.

Mowers, Lawn.

Pennsylvania, New Model, Excelsior, continental, &c.....60¢60¢5%

Philadelphia.....60¢10%
Other Machines.....60¢10¢5%70%

Muzzles—

Safety.....# doz, \$3.00, 25%

Nails.

Cut and Wire. See Trade Report.

Wire Nails, Papered.

Association list, July 15, '89.....75¢10%

Tack Mfrs.' list.....70%
Wire Nails, Standard Penny.

Card June 1, '89, base.....\$2.35 @ \$2.40

Horse—

Nos. 6 7 8 9 10

Assable.....25¢20¢25¢24¢23¢.

Clinton, Fin. 10¢17¢16¢15¢14¢.....30%
Essex.....25¢20¢25¢24¢23¢.

Lyra.....10¢17¢16¢15¢14¢.....30%
Snowden.....10¢17¢16¢15¢14¢.....30%
Putnam.....23¢21¢20¢19¢18¢.

Vulcan.....23¢21¢20¢19¢18¢.....12%45%
Northwestern.....23¢21¢20¢19¢18¢.

Globe.....23¢21¢20¢19¢18¢.....25¢25¢5%

Boston.....23¢21¢20¢19¢18¢.....20¢25¢5%

A. C.....23¢21¢20¢19¢18¢.....25¢10¢33%45%

C. B.-K.....23¢21¢20¢19¢18¢.....33%45%

Maud S.....23¢21¢20¢19¢18¢.....40¢10%

Champlain.....23¢21¢20¢19¢18¢.....25¢1¢10%

New Haven.....23¢21¢20¢19¢18¢.....10¢10¢10%

Saranac.....23¢21¢20¢19¢18¢.....30¢10%

Champion.....23¢21¢20¢19¢18¢.....10¢10¢10%

Capewell.....23¢21¢20¢19¢18¢.....35¢5¢35¢10%

Star.....23¢21¢20¢19¢18¢.....10¢10%

Anchor.....23¢21¢20¢19¢18¢.....35%

Western.....23¢21¢20¢19¢18¢.....40¢10%

Empire Bronze.....14¢7¢.

Picture—

Brass Head, Sargent's list.....50¢10¢10%

Brass Head, Combination list.....50¢10%

Porcelain Head, Sargent's list.....50¢10¢10%

Porcelain Head, Combination list.....40¢10%

Niles' Patent.....40%

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Square, Hex.

Hot Pressed.....5.40¢ 6.00¢ off list.

Cold Punched.....5.00¢ 5.10¢ off list.

In packages of 100 lb, add 1-10¢ # lb.

net; in packages less than 100 lb, add 1/4¢ # lb, net.

Oakum—

Best.....# 7 1/4¢7 1/2¢

U. S. Navy.....# 6 1/2¢6 3/4¢

Navy.....# 6 1/2¢6 3/4¢

World's Best, # gross, No. 1, \$12.00
No. 2, \$24.00; No. 3, \$36.00.....60¢10%
Universal, # doz \$3.00.....45%
Domestic, # doz \$2.50.....45%
Champion # doz \$2.00.....55%

Packing, Steam—

Rubber—

Standard.....60¢5¢65%

Extra.....50¢50¢55%

N. Y. B. & P. Co., Standard.....50%

N. Y. B. & P. Co., Empire.....50%

N. Y. B. & P. Co., Salamander.....50%

Jenkins' Standard, # 80¢.....25¢25¢5%

Miscellaneous—

American Packing.....10¢11¢7¢

Russia Packing.....14¢7¢

Italian Packing.....13¢14¢7¢

Cotton Packing.....15¢17¢7¢

Jute.....7¢8¢7¢

Padlocks—See Locks.

Pails.

Galvanized Iron—

Quarts 10 12 14

Hill's Light Weight, # doz \$2.75 3.00 3.25

Hill's Heavy Weight, # doz 3.00 3.25 3.75

Helwig's.....2.50 2.75 3.00

Sidney Shepard & Co.....2.50 2.75 3.00

Fire Buckets.....2.50 2.75 3.00

Buckets, see Well Buckets.

Indurated Fibre Ware—25%

Star Pails, 12 qt.....# doz \$6.00

Fire Pails, 14 qt.....# doz \$7.80

Standard Fibre Ware—

Plain, Dec'd

Water Pails, 12 qt., per doz \$4.00 \$4.50

Dairy Pails, 14 qt., per doz 4.50 5.00

Fire Pails, No. 1, 12 qt. per doz 4.50

Fire Pails, No. 2, 14 qt. per doz 5.00

Sugar Pails.....6.00 6.50

Horse Pails.....5.00

Buggy Pails.....5.00 6.00

Chamber Pails, 14-qt.....6.50 7.50

Pans.

Dripping.

Small sizes.....# 6 1/2¢

Large sizes.....# 5 1/2¢

Silver & Co. (Covered).....40%

Standard List:

No. 1 2 3 4

doz \$3.00 \$3.75 \$4.25 \$4.75 \$5.25

No. 5 6 7 8

doz \$6.00 \$7.00 \$8.00 \$9.00

Polished, regular goods.....70¢10%

Acme Fry Pans.....60¢10%

Dust—

Steel Edge, No. 1.....# doz \$1.75

Paper and Cloth—

Sand and Emery—

List April 19, 1889.....50¢50¢10%

Sibley's Emery and Crocus Cloth.....30%

Parers.

Apple.

Advance.....# doz \$4.75

Baldwin.....# doz 5.25

Bonanza.....each 5.00

Champion.....# doz 7.25

Daisy.....# doz 4.00

Dandy.....each 7.50

Eureka.....each 16.00

Family Bay State.....# doz 12.00

Favorite.....# doz 5.00

Gem.....# doz 5.25

Gold Medal.....# doz 4.00

Ideal.....# doz 4.00

Iron Planes—

Balloy's (Stanley R. & L. Co.).....40¢10¢40¢10¢10%

Miscellaneous Planes (Stanley R. & L. Co.).....30¢10¢30¢10¢10%

Victor Planes (Stanley R. & L. Co.).....20¢10¢20¢10¢10%

Steel's Iron Planes.....35¢35¢10%

Meriden Mfg. Co.'s.....40¢40¢10%

Davis's Iron Planes.....40¢40¢10%

Birmingham Plane Co.....50¢50¢10%

Gage Tool Co.'s Self-Setting.....20¢10¢10%

Chaplin's Iron Planes.....40¢40¢10%

Sargent's.....30¢10¢30¢10¢10%

Standard Tool Co.....50¢50¢5%

Plane Irons—

Butcher's.....\$5.00 @ \$5.25 to 2

Buck Bros.....30%

Auburn "Thistle".....35¢2%

Ohio.....35¢2%

Sandusky.....35¢2%

S. & J. J. White.....25%

Plates.

Felco.....# 6¢6 1/4¢

Pliers and Nippers—

Button's Patent.....50¢50¢10%

No. 2, 5 in., \$13.50; No. 4, 7 in. \$21.00 # doz \$20.10 \$33.50

Hudson & Beckley Mfg. Co. 50¢50¢10%

Lindsay's Giant.....40%

Gas Pliers.....60%

Gas Pliers, Custer's Nickel Plated.....60¢5%

Eureka Pliers and Nippers.....40%

Russell's Parallel.....25%

P. S. & W. Tinner's Cutting Nippers.....50%

Carver's Pat. Wire Cutters.....20%

Morrill's Parallel, # doz \$12.00.....60¢5%

Cronk's 8 in., \$15.00; 10 in. \$21.00.....40¢40¢5%

Plumbs and Levels—

Regular List.....70¢10¢70¢10¢10%

Disston's.....50%

Pocket Levels.....70¢10¢70¢10¢10%

Davis Iron Levels.....30%

Davis' Inclinoimeters.....10¢10%

Punchers.

Egg.

Buffalo Steam Egg Poachers, # doz, No. 1, \$6.00; No. 2, \$8.00.....25%

Silver & Co., 6-Ring, # doz \$4; 3-Ring \$2

Pokes, Animal—

Bishop's I. L. L.....# doz \$6.00

Bishop's O. K.....# doz \$5.25

Bishop's Pioneer.....# doz \$3.75

Bishop's American.....# doz \$2.75

Bishop, Double Stale.....# doz \$5.75

Eagle, Single Stale.....# doz \$3.75

Buckeye, Single Stale.....# doz \$2.75

Police Goods.

R. I. Tool Co., Handcuffs, \$15.00 # doz 10%

R. I. Tool Co., Leg Irons, \$25.00 # doz 10%

Tower's.....25%

Daley's Improved Handcuffs, 3 Hands, Polished, \$45.00; 5 gro 100, Nickel-plated, \$57.00; 3 Hands, Polished, # doz \$72.00; Nickel-plated, \$84.00.....25%

J. P. Lovell's Police Goods.....25%

Polish, Metal.

Prestoline.....30%

Prestoline Paste.....33 1/4%

Gaston's Silver Compound.....33 1/4%

Polish, Stone.

Joseph Dixon's.....# gro \$6.00, 10%

Gem.....# gro \$4.50, 10%

Gold Medal.....# gro \$6.00, 25%

Mirror.....# gro \$6.00, 25%

Lustr.....# gro \$4.75

Polish Sun, 5 gro 100.....# gro \$3.75

Rising Star.....# gro \$5.50

Dixon's Plumbago.....# 8¢

Boynton's Noon Day, # gro.....13.00

Famps—

Clatern, Best Makers.....00¢00¢10%

Pitcher Spout, Best Makers.....67¢47%

Pitcher Spout, Cheaper Goods.....70¢70¢5%

Punches—

Saddlers' or Drive, good, # doz.....60¢05%

Bemis & Call Co.'s Cast Steel Drive.....50¢5%

Bemis & Call Co.'s Springfield Socket.....50¢5%

Spring, good quality.....# doz \$2.50 2.60

Spring, Leach's Pat.....15%

Bemis & Call Co.'s Spring and Check.....40%

Solid Tinner's, P. S. & W. Co. # doz \$1.44, 55%

Tin's Hollow Punches P. S. & W. Co. 20¢2%

Rice Hand Punches.....15%

Avery's Revolving.....40%

Avery's Saw-Set and Punch, See Saw Sets.

Rail—

Sliding Door, Wrt Brass, # 35¢.....15%

Sliding Door, Bronzed Wrt Iron, # ft. 7¢

Sliding Door, Iron, Painted, # foot 4¢, 40%

Barn Door Light, in.....# 4¢

Per 100 feet.....\$2.00 2.50 3.10, 10%

B. D. for N. E. Hangers.....Small, Med. Large.

Per 100 feet.....\$2.15 2.70 3.25, net

Atkins' Circular Shingle and Heading dis 50%
 Atkins' Silver Steel Diamond X Cuts foot 70%
 Atkins' Special Steel Dexter X Cuts foot 50%
 Atkins' Special Steel Diamond X Cuts foot 22%
 Atkins' Champion and Electric Tooth X Cuts foot 30%
 Atkins' Hollow Back X Cuts foot 20%
 Atkins' Muley, Mill and Drag foot 40%
 Atkins' One-Man Saw, with handles, foot 40%
 Peace Circular and Mill 45%
 Peace Hand Panel and Rip 25%
 Peace Cross Cuts 45%
 Richardson's Circular and Mill 45%
 Richardson's X Cuts 45%
 Richardson's Hand, &c. 25%
 C. E. Jennings & Co., Hand, Panel and Rip 25%
 Hack Saws—
 Griffin's, complete 40%
 Griffin's Hack Saw, Blades 40%
 Star Hack Saws and Blades 35%
 Eureka and Crescent 35%
 Scroll—
 Lester, complete, \$10.00 25%
 Rogers, complete, \$4.00 25%
 Barnes' Builders' and Cabinet Makers' \$15 25%
 Barnes' Scroll Saw Blades 35%
 Saw Frames—See Frames, Saw.
 Saw Sets—See Sets, Saw.
 Saw Tools—See Tools, Saw.
 Scales—
 Hatch, Counter, No. 171, good quality, \$21.00
 Hatch, Tea, No. 161, \$21.00
 Union Platform, Plain, \$21.00
 Union Platform, Striped, \$24.00
 Chatillon's Grocers' Trip Scales 60%
 Chatillon's Eureka 25%
 Chatillon's Favorite 40%
 Family, Turnbills 30%
 Rieble Bros.' Platform 40%
 Scale Beams—See Beams, Scale.
 Scissors, Fluting 45%
 Scrapers—
 Adjustable Box Scraper (S. R. & L. Co.) \$6.50
 Box, 1 Handle, \$2.00
 Box, 2 Handle, \$2.00
 Defiance Box and Ship 30%
 Foot, \$5.00
 Ship, Common, \$3.50
 Ship, R. I. Tool Co. 10%
 Screen Window and Door Frames—See Frames.
 Screw Drivers—See Drivers, Screw.
 Screws,
 Bench and Hand—
 Bench, Iron, \$5.00
 Bench, Wood, Beech, \$2.25
 Bench, Wood, Hickory, \$2.00
 Hand, Wood, \$2.50
 Lag, Blunt Point, List Jan. 1, 1890, 75%
 Coach and Lag, Gimlet Point, List Jan. 1, 1890, 75%
 Hand Nail, Sargent's, 60%
 Hand Nail, H. & F. Mfg. Co., 70%
 Hand Nail, Am. Screw Co., 75%
 Jack Screws, Millers Falls list, 60%
 Jack Screws, F. S. & W., 35%
 Jack Screws Sargent's, 60%
 Jack Screws Stearns', 40%
 Cork—
 Humason & Beckley Mfg. Co., 40%
 Williamson's, 35%
 Howe Bros. & Hulbert, 35%
 Machine—
 Flat Head, Iron, 55%
 Round Head, Iron, 50%
 Wood—
 List January 1, 1891.
 Flat Head Iron, 72%
 Round Head Iron, 67%
 Flat Head Brass, 71%
 Round Head Brass, 65%
 Flat Head Bronze, 72%
 Round Head Bronze, 65%
 Rogers' Drive Screws, 83%
 Scroll Saws—See Saws, Scroll.
 Scythes,
 Grain, 40%
 Grass, 40%
 Scythe Snaths—See Snaths, Scythe.
 Sets,
 Avel and Tool,
 Aiken's Sets, Avels and Tools, No. 20, \$10.00, 55%
 Fray's Adj. Tool Hds., Nos. 1, 112, 2, 118, 3, 112, 4, 90, 25%
 Miller's Falls Adj. Tool Hds., No. 1, 112, 2, 118, 25%
 Henry's Combination Hds., \$2.50
 Brad Sets, No. 42, \$10.50; No. 43, \$12.50, 70%
 Stanley's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50, 30%
 Nail—
 Square, \$7.40
 Round, \$7.32
 Buck Bros., 37%
 Cannon's Diamond Point, \$12.20
 Rivet,
 Regular list, 60%
 Saw—
 Stillman's Genuine, \$5.00
 Stillman's Imita., \$3.25
 Common Lever, \$2.00
 Morrill's No. 1, \$15.00; No. 2, \$24.00
 Leach's, No. 0, \$9.00; No. 1, \$15.00
 Smith's Adjustable Sifters, \$2.00

Hammer, Hotchkiss, \$5.50, 10%
 Hammer, Bemis & Call Co.'s new Pat. 30%
 Bemis & Call Co.'s Lever and Spring Hammer, 30%
 Bemis & Call Co.'s Plate, 10%
 Bemis & Call Co.'s Cross Cut, 12%
 Aiken's Genuine, \$13.00, 50%
 Aiken's Imitation, \$7.00, 55%
 Barton's Pat. Lever, 25%
 Barton's Stat., 25%
 Leopold, 40%
 Atkin's Lever, \$2.00, 10%
 Atkin's Criterion, \$2.00, 10%
 Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00, 40%
 Avery's Saw Set and Punch, 60%
 Chieftain H. R. Co.'s Superior, \$15.00, 50%
 Sharpeners, Knife,
 Parkins,
 Applewood Handles, \$2.00, 40%
 Rosewood or Cocobolo, \$2.00, 40%
 Shaves, Spoke,
 Iron, 45%
 Wood, 30%
 Bailey's (Stanley R. & L. Co.), 40%
 Stearns', 30%
 Cincinnati, 35%
 Goodell's, \$2.00, 25%
 Shears—
 American (Cast) Iron, 75%
 Barnard's Lamp Trimmers, \$2.75
 Timmers', List, Dec. 1881, 25%
 Seymour's, List, Dec. 1881, 25%
 Heinisch's, List, Dec. 1881, 25%
 Heinisch's Tailor's Shears, 35%
 First quality C. S. Trimmers, 30%
 Second quality C. S. Trimmers, 25%
 Acme Cast Shears, 10%
 Diamond Cast Shears, 10%
 Clipper, 10%
 Victor Cast Shears, 75%
 Howe Bros. & Hulbert, Solid Forged Steel, 40%
 Chicago Drop Forge & F. Co., Solid Steel Forged, 60%
 Claus Shear Co., Japaned, 70%
 Claus Shear Co., Nickel, same list, 60%
 Galvanic, 3% to 9 in, \$1.00, 10%
 Pruning Shears and Hooks,
 Diston's Combined Pruning Hook and Saw, \$13.00, 20%
 Diston's Pruning Hook, \$12.00, 20%
 E. S. Lee & Co.'s Pruning Tools, 40%
 Pruning Shears, Henry's Pat., \$3.75, 40%
 Henry's Pruning Shears, \$4.25, 40%
 Wheeler, M. & C. Co.'s Combination, \$12.00, 20%
 Dunlap's Saw and Chisel, \$5.50, 30%
 J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25
 P. S. & W. Co., 60%
 Timmers', &c.—
 Shears and Snips (P. S. & W.), 20%
 Snips, J. Mallinson & Co., 35%
 Sheaves—
 Sliding Door—
 M. W. Co., List July, 1888, 50%
 R. & E., List Dec. 18, 1885, 55%
 Corbin's list, 60%
 Patent Roller, 60%
 Patent Roller, Hatfield's, 75%
 Russell's Anti-Friction, List Dec. 18, 1885, 60%
 Moore's Anti-Friction, 50%
 Sliding Shutter—
 R. & E., List Dec. 18, 1885, 60%
 Sargent's list, 60%
 Reading list, 60%
 Ship Tools—
 L. & I. J. White, 20%
 Shoes, Horse, Mule, &c.—
 Burden's, Perkins', Phoenix, at factory, \$4.00
 Mule—
 Add \$1 per keg to above prices.
 Or, Wrought—
 Ton lots, \$9.00
 1000 lb lots, \$9.00
 500 lb lots, \$9.00
 Shot—
 Drop, up to BB, 25-b bag, \$1.32, 1.37
 Drop, up to BB, 5-b bag, .35, .36
 Drop, BB and larger, 2-b bag, 1.57, 1.62
 Drop, BB and larger, 5-b bag, .40, .41
 Buck and Chilled, 25-b bag, 1.57, 1.62
 Buck and Chilled, 5-b bag, .40, .41
 Rust Shot, 25-b bag, 2.00, 2.05
 Rust Shot, 5-b bag, .45, .46
 Shovels and Spades—
 Ames' Shovels, Spades, &c., list Nov. 1, 1885, 30%
 NOTE.—Jobbers frequently give 5% extra on above.
 Griffith's Black Iron, 60%
 Griffith's C. S., 60%
 Griffith's Solid C. S. R. R. Goods, 20%
 St. Louis Shovel Co., 20%
 Hussey, Binns & Co., 15%
 Hubbard & Co., 30%
 Lehigh Mfg. Co., 50%
 H. M. Myers Co., 30%
 Payne Petebone & Son, 30%
 Remington's (Lowman's) Pat., 30%
 Rowland's, Black Iron, 50%
 Rowland's Steel, 60%
 Shovels and Tongs—
 Iron Head, 60%
 Brass Head, 60%
 Sifters—
 Mann's Tin Rim, 50%
 Buffalo Metallic, S. B. & Co., 50%
 Shaker (Barley's) Pat. Flour Sifters, \$2.00, 10%
 Electric, \$2.00, 10%
 A. & W. Sifters, \$2.00, 10%
 Hunter's, \$2.00, 10%
 Smith's Adjustable Sifters, \$2.00, 10%

Smith's Adjustable Milk Strainer, \$2.00
 Smith's Adjustable T. & C. Strainer, \$1.25
 Steves, Wooden Rim—
 Mesh 18, Nested, \$2.00, 1.00
 Mesh 20, Nested, \$2.00, 1.10
 Mesh 24, Nested, \$2.00, 1.15
 Skains, Thimble—
 Western list, 75%
 Columbus Wrt. Steel, Special net prices
 Coldbrookdale Iron Co., 60%
 Seneca Falls Pattern, 60%
 Utica P. T. Skains, 60%
 Utica Turned and Fitted, 85%
 Slates—
 School, by case, 50%
 Snaps, Harness, &c.—
 Anchor (T. & S. Mfg. Co.), 65%
 Fitch's (Bristol), 60%
 Hotchkiss, 10%
 Andrews, 50%
 Sargent's Patent Guarded, 70%
 German, new list, 40%
 Covert, 50%
 Covert, New Patent, 50%
 Covert, New R. E., 60%
 Covered Spring, 60%
 Snaths, Scythe,
 List, 50%
 Soldering Irons—See Irons, Soldering.
 Spittoons, Cuspidors, &c.,
 Standard Fibercare—
 Cuspidors, 8 1/2-inch, \$2.00, No. 5, \$8; No. 6, \$9
 Spittoons, Dally, 8-inch, No. 1, \$4; 10 and 11 inch, \$6
 Spoke Shaves—See Shaves, Spoke.
 Spoke Trimmers—See Trimmers, Spoke.
 Spoons and Forks—
 Tinned Iron—
 Basting, Cen. Stamp. Co.'s list, 70%
 Solid Table and Tea, Cen. Stamp. Co.'s list, 70%
 Buffalo S. S. & Co., 35%
 Silver-Plated—(4 mos. or 5% cash 30 days)
 Meriden Brit. Co., Rogers, 40%
 C. Rogers & Bros., 40%
 Rogers & Barton, 40%
 Wm. Rogers Mfg. Co., 40%
 Simpson, Hall, Miller & Co., 40%
 Holmes & Edwards Silver Co., 40%
 L. Boardman & Son, 50%
 Miscellaneous,
 Holmes & Edwards Silver Co., 50%
 No. 67 Mexican Silver, 50%
 No. 30 Silver Metal, 50%
 No. 24 German Silver, 50%
 No. 50 Nickel Silver, 50%
 Wm. Rogers Mfg. Co., 50%
 Rogers' Silver Metal, 50%
 18% Rogers' German Silver, 60%
 22% Rogers' Nickel Silver, 60%
 German Silver, 50%
 German Silver, Hall & Elton, 50%
 Nickel Silver, 50%
 Britannia, 50%
 Boardman's Nickel Silver, 50%
 Boardman's Britannia Spoons, case lots, 60%
 Springs—
 Door—
 Torrey's Rod, regular size, \$1.30
 Gray's, \$2.00, 20%
 Bee Rod, \$2.00, 20%
 Warner's No. 1, \$2.50, 20%
 Gem (Coll), list April 19, 1886, 10%
 Star (Coll), list April 19, 1886, 20%
 Victor (Coll), 60%
 Champion (Coll), 60%
 Philadelphia, 5 in, \$5.00; 8 in, \$7.75, \$15.00, No. 1, \$2.00, No. 2, \$3.00
 Rubber, complete, \$2.50, 55%
 Hercules, 50%
 Shaw Door Check and Spring, 30%
 Carriage, Wagon, &c.—
 Elliptic, Concord, Platform and Ball Roll, 60%
 Cliff's Bolster Springs, 25%
 Squares—
 Steel and Iron, 80%
 Nickel-Plated, 60%
 Try Square and T Bevels, 60%
 Diston's Try Square and T Bevels, 60%
 Winterbottom's Try and Titer, 30%
 Starrett's Micrometer Caliper Squares, 25%
 Avery's Flush Bevel Squares, 40%
 Avery's Bevel Protractor, 50%
 Squeezers—
 Fodder—
 Blair's "Climax", \$2.00, \$1.25
 Lemon—
 Porcelain Lined, No. 1, \$2.00, 25%
 Wood, No. 2, \$3.00, 35%
 Wood, Common, \$1.70, 1.75
 Dunlap's Improved, \$3.75, 20%
 Samuels, No. 1, \$5.00; No. 2, \$9.12, \$18.00
 Jennings' List, \$2.50, 25%
 The Boss, \$2.50, 25%
 Dean's, No. 1, \$2.50; 2, \$3.35; 3, \$1.90; Queen, \$2.50
 Little Giant, 50%
 King, 40%
 Hotchkiss Straight Flash, \$2.00, 10%
 Silver & Co., Glass, \$2.00, 10%
 Standard Fiber Ware—See Ware, Standard Fiber.
 Staples—
 Blind—
 Barbed, 1/2 in. and larger, \$7.75, 7%
 Barbed, 3/4 in. and larger, \$8.85, 8%

Fence Staples, Galvanized, Same price as Brd Wire.
 Fence Staples, Plain, See Trd. Rep.
 Steelyards, 40%
 Stocks and Dies—
 Blacksmith's
 Waterford Goods, 40%
 Butterfield's Goods, 40%
 Lightning Screw Plate, 35%
 Reece's New Screw Plates, 35%
 Reversible Ratchet, 30%
 Gardner, 25%
 Stops, Bench,
 Morrill's, \$2.00, 50%
 Hotchkiss, \$2.00, 50%
 Weston's, No. 1, \$10; No. 2, \$25, 10%
 McGill's, \$2.00, 10%
 Cincinnati, 25%
 Stone—
 Hindostan No. 1, 3; Aze, 3; Silps No. 1, 4 1/2
 Sand Stone, 2 1/2
 Washita Stone, Extra, \$2.25
 Washita Stone, No. 1, \$1.50
 Washita Stone, No. 2, \$1.12 1/2
 Washita Silps, No. 1, Extra, \$2.75
 Washita Silps, No. 1, \$2.50
 Arkansas Stone, No. 1, 4 to 6 in, \$1.50
 Arkansas Stone, No. 1, 6 to 9 in, \$1.85
 Turkey Oil Stone, 4 to 8 in, \$1.00
 Lake Superior, Chase, \$1.00
 Lake Superior Silps, Chase, \$1.00
 Seneca Stone, Red Paper Brand, \$1.80
 Seneca Stone, Small Whets, \$2.25
 Stove Polish—See Polish, Stove.
 Stretchers, Carpet,
 Cast Steel, Polished, \$2.32
 Cast Iron, Steel Points, \$2.80
 Socket, \$1.75
 Jullard's, 25%
 Straps, Razor—
 Genuine Emerson, 60%
 Imitation, \$2.00, 20%
 Torrey's, 20%
 Badger's Belt and Com., \$2.00
 Lamont Combination, \$4.00
 Jordan's Pat. Padded, list Nov. 1, 80%
 Electric, list net
 Stuffers or Fillers, Sausage—
 Miles' "Challenge", \$2.00, 50%
 Perry, \$2.00, 50%
 Enterprise Mfg. Co., 40%
 Sweepers, Carpet,
 Bissell No. 5, \$2.00, 17%
 Bissell No. 7 New Drop Pan, \$2.00, 17%
 Bissell, Grand, \$2.00, 17%
 Grand Rapids, \$2.00, 17%
 Crown Jewel, No. 1, \$1.00; No. 2, \$1.00
 Magic, \$2.00, 15%
 Jewel, \$2.00, 15%
 Improved Parlor Queen, \$2.00, 15%
 Nickered, \$2.00, 15%
 Japanned, \$2.00, 15%
 Excelsior, \$2.00, 15%
 Garland, \$2.00, 15%
 Parlor Queen, \$2.00, 15%
 Housewife's Delight, \$2.00, 15%
 Queen, \$2.00, 15%
 Queen, with band, \$2.00, 15%
 King, \$2.00, 15%
 Wheel, Improved, \$2.00, 15%
 Hub, \$2.00, 15%
 Cog-Wheel, \$2.00, 15%
 Easy, \$2.00, 15%
 Monarch, \$2.00, 15%
 Goshen, \$2.00, 15%
 Ladies' Friend, \$2.00, 15%
 Advance, \$2.00, 15%
 Supreme, \$2.00, 15%
 Tacks, Brads, &c.—
 List Oct. 10, 1890, Standard Weights.
 Carpet Tacks—
 American Iron, Blued, 77%
 American Iron, Tin'd or Cop'd, 77%
 Steel, Plain or Bright, 75%
 Steel, Tinned or Coppered, 75%
 Sweden Iron, Blued, 75%
 Sweden Iron, Tinned or Cop'd, 75%
 American Iron Cut Tacks, 75%
 Sweden Iron Uphol's Tacks, Blued, 75%
 Sweden Iron Uphol's Tacks, 75%
 Tinned, 77%
 Gimp and Lace Tacks, Blued, 75%
 Gimp and Lace Tacks, Tinned, 75%
 Sweden Iron Basket or Trimmers' Tacks, 70%
 Miners' Tacks, 75%
 Bill-Posters' or Railroad Tacks, 75%
 Bill-Posters' or Railroad Tacks, Tinned, 77%
 Copper Tacks, 40%
 Copper Finish, & Trunk Nails, 40%
 Cigar Box Nails, 50%
 Zinc Glaziers' Points, 40%
 Picture-Frame Points, 50%
 Looking-Glass Tacks, 50%
 Brush Tacks, 60%
 Tin-Capped Trunk Nails, 60%
 Finishing Nails, 70%
 Trunk and Clout Nails, Black and Tinned, 75%
 Common and Patent Brads, 70%
 Hungarian Nails, 70%
 Basket and Chair Nails, 60%
 Leathered Carpet Tacks, 40%
 Miscellaneous—
 Double-Pointed, 120 count, 85%
 Wire Carpet Nails, 50%
 Plymouth Rock Steel Carpet Tacks, 35%

Well Buckets, Galvanized—See Buckets, Well, Galvanized.

Wheels, Well.
8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.50

Wire and Wire Goods—
from—

Market.
Br. & Ann'd, Nos. 0 to 18.....75¢
Cord'd, Nos. 0 to 18.....72½¢
Galv'd, Nos. 0 to 18.....65¢
Tin'd, Tinned List Nos. 0 to 18.....95¢
Stone,
Br. and Ann'd, Nos. 10 to 18.....75¢
Bright and Ann'd, Nos. 19 to 36.....77½¢
Br. and Ann'd, Nos. 27 to 36.....80½¢
Tinned Brim Wire, No. 21, # 8.....54¢
Galvanized Fence, Nos. 8 and 9.....67½¢
Annealed Fence, Nos. 8 and 9.....77½¢
Annealed Grape, Nos. 10 to 14.....77½¢
Brass, list Jan. 18, 1884.....30¢
Copper, list Jan. 18, 1884.....30½¢
Barb Fence.....See Trade Report
Annealed Wire on Spools.....55¢
Mallin's Steel and Tin'd on Spools.....55¢
Mallin's Brass and Cop. on Spools.....45¢
Tate's Steel, Tinned and Annealed.....55¢
Tate's Spooled Cop. and Brass.....45¢
Cast Steel Wire.....50¢
Stub Steel Wire on Spools.....60¢
Steel Music Wire, 12 to 30.....90¢ to 70¢
Wire Clothes Lines, see Lines,
Wire Picture Cord see Cord.

Bright Wire Goods—

Standard List.....80½¢ to 100¢

Wire Cloth and Netting.

Painted Screen Cloth, good quality,
\$ 100 sq. ft., \$1.40
Galvanized Wire Netting.....70¢ to 100¢ to 75¢

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable.....40¢
Baxter's Adjustable "S".....40¢ to 100¢ to 50¢
Baxter's Diagonal.....40¢ to 100¢ to 50¢
Coe's Genuine.....50¢ to 25¢
Coe's "Mechanics".....50¢ to 100¢ to 25¢
Girard's "Engineers".....60¢ to 100¢
Lamson & Sessions' Standard.....90¢ to 100¢
Lamson & Sessions' Standard.....70¢ to 100¢
P. S. & W. Agricultural.....75¢ to 50¢ to 75¢
Girard Agricultural.....50¢ to 100¢ to 75¢
Lamson & Sessions' Agric'l.....50¢ to 100¢ to 75¢
Bemis & Call's
Pat. Combination.....35¢
Merrick's Pattern.....35¢
Bryant's Pattern.....35¢
Cylinder or Gas Pipe.....40¢ to 85¢
No. 8 Pipe.....40¢ to 100¢
Allen's Pocket (Bright).....\$6.00, 50¢ to 100¢
The Favorite Pocket.....\$6.00, 50¢ to 100¢
Webster's Pat. Combination.....35¢
Boardman's.....90¢ to 100¢
Always Ready.....25¢ to 100¢
Alligator.....50¢
Donohue's Engineer.....50¢ to 100¢
Acme Bright.....50¢ to 100¢
Acme, Nickled.....40¢ to 35¢
Hercules.....70¢
Walker's.....55¢ to 25¢
Diamond Steel.....55¢ to 25¢
Cincinnati Brace Wrenches.....35¢ to 100¢
Tafts' Vise Wrench.....55¢ to 100¢ to 75¢

Wringers, Clothes—
List September 20, 1890, 2½ cash.

Wrought Goods—
Staples, Hooks, &c., list Jan. 12, 1890,
85¢ to 35¢ to 100¢

Vermilion, Quicks'er, bulk.	65	87
Vermilion, Quicks'er, bags.	68	68
Vermilion, Quicksilver,		
smaller pkgs.	70	72
Vermilion, English Import	80	85
Vermilion, Imitation, Eng.	5	25
Vermilion, Imitation, Eng.	97 1/2	90
Vermilion, Chinese.	90	95
Whiting, Common, \$ 100 D	40	45
Whiting, Gliders'.	50	55
Zinc, American, dry....	4 1/2	5
Zinc, French, Red Seal....	..	8 1/2
Zinc, French, Green Seal....	..	7
Zinc, French, V. M. X....	..	7
Zinc, Antwerp, Red Seal....	..	7 1/2
Zinc, Antwerp, Green Seal	..	8
Zinc, German, L. Z. O....	..	6 1/2
Zinc, V. M. in Poppy Oil, &		
Seal, lots of 1 ton and		
over	10 1/2	11 1/2
lots less than 1 ton	11	11 1/2
Zinc, V. M. in Poppy Oil,		
Red Seal....
lots of 1 ton and over....	10	10 1/2
lots less than 1 ton	10 1/2	10 1/2
Discounts.—French Zinc.—Discounts		
to buyers of 10-bbl. lots of one or as-		
sorted grades, 1's; 25 bbls, 2's, 60 bbls,		
1's. No discount allowed on less		
than bbl. lots.		
Colors in Oil.		
Blue, Chinese.....	35	40
Blue, Prussian.....	30	40
Blue, Ultramarine.....	12	18
Brown, Vandyke.....	7	13
Green, Chrome.....	12	13
Green, Paris.....	18	18 1/2
Sienna, Raw.....	7	14
Sienna, Burnt.....	7	14
Umber, Raw.....	7	10
Umber, Burnt.....	7	10
Spirits Turpentine.		
In regular bbls	40 1/2	40
In machine bbls	41	40
Glue.		
Low Grade.....	8	10
Cabinet.....	12	14
Medium White.....	13	15
Extra White.....	17	20
French.....	10	22
English.....	10	15
Irish.....	13	14